Rec'd
10-18-07

Construction Documentation and Post-Remediation Monitoring Report

Construction Oversight Services, Newton Creek Interim Remedial Action

City of Superior, Douglas County, Wisconsin

WDNR No. 03RRSU
SEH No. A-WIDNR9905.03

October 2007

SEH

Multidisciplined. Single Source.
Trusted solutions for more than 75 years.

SEH

October 10, 2007

RE: Construction Oversight Services,
Newton Creek Interim Remedial Action
City of Superior,
Douglas County, Wisconsin
WDNR No. 03RRSU
SEH No. A-WIDNR9905.03

Mr. James A. Hosch
Hydrogeologist/Northern Region Spills Coordinator
WDNR Bureau of Remediation and Redevelopment
1401 Tower Avenue
Superior, WI 54880

Dear Mr. Hosch:

The attached Construction Documentation and Post-Remediation Monitoring Report has been prepared by Short Elliott Hendrickson Inc. (SEH®) for the Wisconsin Department of Natural Resources to summarize the remediation activities and post-remediation monitoring activities performed in Segments B through K of Newton Creek from 2003 to 2006.

If you have any questions regarding this document or the project status, please contact me at 1.800.472.5881.

Sincerely,

Mark J. Broses, PE
Project Manager

Gloria Chojnacki, CHMM
Senior Scientist

JEG/ls/MJB

Construction Documentation and Post-Remediation Monitoring Report

Construction Oversight Services, Newton Creek Interim Remedial Action
City of Superior, Douglas County, Wisconsin

Prepared for:
Wisconsin Department of Natural Resources
Superior, Wisconsin

Prepared by:
Short Elliott Hendrickson Inc.
421 Frenette Drive
Chippewa Falls, WI 54729-3374
715.720.6200

I, Gloria G. Chojnacki, hereby certify that I am a scientist as that term is defined in s. NR 712.03(3), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code

		October 10, 2007
Gloria Chojnacki, CHMM Senior Scientist	CHMM Number	Date

I, Mark J. Broses, PE, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

		October 10, 2007
Mark J. Broses, PE Project Manager	PE Number	Date

Distribution List

No. of Copies	Sent to
3	James A. Hosch, Project Manager Hydrogeologist/Spills Coordinator WDNR Bureau of Remediation and Redevelopment 1401 Tower Avenue Superior, WI 54880
1	John Robinson, Northern Region Supervisor WDNR Bureau of Remediation and Redevelopment 107 Sutliffe Avenue Rhinelander, WI 54501
1	Tom Janisch, Contaminated Sediment Coordinator WDNR Bureau of Remediation and Redevelopment 101 South Webster Street Madison, WI 53707-7921
1	Scott Cieniawski USEPA GLNPO 77 W. Jackson Blvd Chicago, IL 60604
1	Henry Nehls Lowe Department of Health and Family Services 1414 E. Washington Avenue Madison, WI 53703
1	Vicky Drake Douglas County Health Department 1409 Hammond Ave Superior, WI 54880
1	Jeff Vito City of Superior 1407 Hammond Ave Superior, WI 54880
1	Librarian City of Superior 1530 Tower Avenue Superior, WI 54880

Distribution List (Continued)

1	Susan Sandvick, County Clerk Douglas County 1004 Cumming Avenue Superior, WI 54880
1	Mark Sitek Lakehead Pipeline – Enbridge Energy 21 West Superior Street Duluth, MN 55802
1	Joe Amato Murphy Oil USA Superior Refinery 2407 Stinson Avenue Superior, WI 54880
1	St. Louis River Citizens Action Committee 394 Lake Avenue South, Suite 303b Duluth, MN 55802

Executive Summary

Newton Creek begins near the Murphy Oil USA (Murphy) refinery in Superior, Wisconsin, and ends at its mouth located at Hog Island Inlet, which discharges to the St Louis River Area of Concern. In previous studies, the Wisconsin Department of Natural Resources (WDNR) had determined that exposure to PAH-contaminated sediments and suspended sediments in the water column posed unacceptable risks to human health and the environment.

An interim remedial action was performed on Segments B through K of the Newton Creek system to remove visually observable contaminated soft sediments from the creek channel. The interim remedial action was jointly funded by the WDNR and the USEPA Great Lakes National Program Office (GLNPO). Via a competitive public bidding process, Onyx Special Services was selected to perform the interim remedial action construction activities. Short Elliott Hendrickson Inc. (SEH®) was retained by the WDNR to provide design, permitting, and construction observation and documentation services.

Approximately 7,300 tons of impacted material was removed from Segments B through K of Newton Creek during the Interim Action from July through September 2003. This included remediation of 6,000 feet of creek channel and 1,100 feet of culverts. The creek flow was temporarily diverted during construction to avoid mobilization and downstream transport of contaminants during construction. The contaminated materials were stabilized with sawdust, then transported via trucks by licensed special waste haulers for disposal at the Lake Area Landfill in Sarona, Wisconsin.

Upon completion of remedial activities, the creek channel was restored by placement of breaker run stone overlain by streambed stone. Disturbed areas of the bank were restored by placement of erosion control fabric, coir rolls, seeding, and live stake shrubs and trees.

In late October 2003, macroinvertebrate samples were collected from six locations in the creek. Significant post-remediation improvements in the benthic macroinvertebrate community were identified, including increases in taxa richness and diversity and the appearance of sensitive species.

During the summer of 2004, Onyx returned to the site to remove approximately 100 tons of additional contaminated sediments from 200 feet of culverts beneath the BNSF railroad; to grade and cover waste in a historical dump discovered in Segment D; and to make repairs to vegetation restoration areas. Final vegetation restoration efforts were deemed acceptable by the WDNR in 2005 and Onyx submitted final contract closeout documents.

In October 2004 and August 2006, sediment was collected from sediment traps located at six locations in the creek and analyzed for historically present contaminants. Post-remediation PAH contaminant concentrations in the sediments did not appear to pose unacceptable risks to human health or the environment. In addition, macroinvertebrate population studies were conducted at the same locations chosen for the post-remediation chemical analyses. Results in Segments B, D, F, and G showed increased diversity, indicating a positive step toward improved water quality. Segments A and L results are inconclusive.

List of Abbreviations

BNSF	Burlington Northern Santa Fe
DRO	Diesel Range Organics
ECRM	Erosion Control Revegetative Mat
FID	Flame Ionization Detector
LSRI	Lake Superior Research Institute
mg/Kg	milligram/kilogram
Murphy	Murphy Oil USA
NC	Newton Creek
Onyx	Onyx Special Services
PAH	Polynuclear Aromatic Hydrocarbons
PID	Photoionization detector
SEH	Short Elliott Hendrickson Inc.
TOC	Total Organic Carbon
TPAH	Total Polycyclic Aromatic Hydrocarbons
µg/Kg	microgram/kilogram
µg/l	microgram/liter
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USEPA GLNPO	USEPA Great Lakes National Program Office
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollution Discharge Elimination
Wis. Adm. Code	Wisconsin Administrative Code

Table of Contents

Table of Contents (Continued)

Table of Contents (Continued)

List of Tables

List of Figures

List of Appendices

Construction Documentation and Post-Remediation Monitoring Report

Construction Oversight Services, Newton Creek Interim Remedial Action

Prepared for the Wisconsin Department of Natural Resources

1.0 Introduction

Newton Creek begins near the Murphy Oil USA (Murphy) refinery in Superior, Wisconsin, and ends at its mouth located at Hog Island Inlet, which discharges to the St Louis River Area of Concern as presented in Figure 1, "Site Location." In previous studies, the Wisconsin Department of Natural Resources (WDNR) had determined that exposure to PAH contaminated sediments and suspended sediments in the water column posed unacceptable risks to human health and the environment.

An interim remedial action was performed on Segments B through K of the Newton Creek system to remove visually observable contaminated soft sediments from the creek channel. The interim remedial action was jointly funded by the WDNR and the USEPA Great Lakes National Program Office (GLNPO).

Onyx Special Services (Onyx) was selected, via a competitive public bidding process, to perform the interim remedial action construction activities. Short Elliott Hendrickson Inc. (SEH®) was retained by the WDNR to provide design, permitting, and construction observation and documentation services.

Segments B through K of Newton Creek were addressed during this Interim Remedial Action. These segments comprise approximately 6,000 feet of streambed with approximately 1,300 feet of connecting culverts extending from the BNSF rail crossing adjacent to the Dome Petroleum facility to the culvert passing under U.S. Highway 2 East (Second Street) as identified on Figure 2, "Site Features - Segments A - L."

1.1 Project Contacts

James A. Hosch, Project Manager
WDNR Bureau of Remediation and Redevelopment
1401 Tower Avenue
Superior, WI 54880
715.392.0802

Mark J. Broses, PE, Project Engineer
Short Elliott Hendrickson Inc.
421 Frenette Drive
Chippewa Falls, WI 54729
800.472.588

2.0 Project Background

2.1 Site Description

The Newton Creek and Hog Island system is located in the City of Superior, Wisconsin, comprising portions of Section 25, T49N, R14W and Sections 19 and 30, T49N, R13W. The Newton Creek and Hog Island system is defined by the WDNR as including the surface water environment encompassing Newton Creek Impoundment, Newton Creek, Hog Island Inlet, Superior Bay at the Inlet mouth, and all floodplain, overflow areas, and wetlands associated with these bodies of water.

Newton Creek flows through numerous culverts and under bridges that exist where the creek intersects roadways and rail lines. Newton Creek and its contiguous wetlands encompass approximately 60 acres with the total length of the system extending approximately 1.5 miles. Newton Creek flows through industrial, commercial, and residential areas in the City of Superior before reaching Hog Island Inlet. The WDNR classifies Newton Creek as a limited forage fish community.

Under normal conditions (without runoff from seasonal thaws or precipitation events) the creek width averages approximately three feet, and the creek depth averages approximately six inches. However, during a major runoff event, the creek depth may increase to as much as five feet, and the width to as much as 100 feet.

2.2 Newton Creek Segments

A previous investigation of Newton Creek (WDNR, 1995) subcategorized Newton Creek into 12 segments (A - L), with Segment A being the most upstream section of the creek (downstream from the impoundment), and Segment L being the most downstream section of the creek before it discharges into Hog Island Inlet.

Adjacent properties at the upper end of Newton Creek, in the vicinity of the impoundment, and Segments A, B and C include the Murphy petroleum refinery, Dome Petroleum natural gas tank farm, and the Lakehead Pipeline crude oil tank farm. Segments A through D primarily run though open field and wooded areas. There are a few residences on Stinson Avenue that parallel Segment D. Segments E through K flow through residential areas of the city, including Segments I and J which flow past a city park and school.

A Burlington Northern Santa Fe (BNSF) railroad runs parallel to the creek for its entire length and crosses above the creek at several locations.

2.3 Site History

The Newton Creek system has been the focus of WDNR investigations for several years. Remediation activities were performed previously by Murphy Oil in Segment A and the upstream impoundment area.

The previous reports regarding Newton Creek that were reviewed by SEH for the Interim Remedial Action are listed below in chronological order:

- Identification of Pollutants of Concern, Further Needed Site Assessments, and Estimated Remediation Costs for Contaminated Sediments in Newton Creek, Hog Island Inlet, and Potentially, Superior Harbor, WDNR, April 6, 1992;
- Newton Creek/Hog Island Inlet Investigative Survey, Eder Associates Consulting Engineers (for Murphy), November 1993;
- Evaluation of Sediment Contamination at Newton Creek and Hog Island Inlet, ENSR Consulting Engineers (for Murphy), December 1993;
- Human Health Risk Assessment for Newton Creek and Hog Island Inlet, ENSR Consulting Engineers (for Murphy), August 1994;
- Assessment of Wetland Habitats Associated with the Newton Creek System, Don Reed (for WDNR), November 23, 1994;
- Characterization of Sediment Contamination in the Newton Creek System, WDNR, December 15, 1994;
- DRAFT RCRA 3008(h) Consent Order to Murphy Oil USA, Inc., Superior, Wisconsin Facility. USEPA ID No. WID 816 194 336. USEPA, March 01, 1995 DRAFT;
- Summary of Investigation Activities Associated with the WDNR Newton Creek Feasibility Study Supplementary Site Characterization, Burns & McDonnell (for Murphy), March 1995;
- Remedial Alternatives Array Document for Newton Creek System, RMT (for WDNR), April 1995;
- Feasibility Study Report for Newton Creek System, RMT (for WDNR), October 1995;
- Newton Creek System Sediment Contamination Site Characterization Report, WDNR, December 1, 1995;
- Results of Aerobic Biodegradation Screening Treatability Study for the Newton Creek System, RMT (for WDNR), January 1996;
- Closure/Post-Closure Plan for Wastewater Treatment Ponds Nos. 1 & 6, Wisconsin Petroleum Refinery, Murphy Oil USA, Inc., Burns & McDonnell (for Murphy), June 1996;

- Superior Refinery Pond Closure Project Final Workplan for Newton Creek Remediation, Roy F. Weston (for Murphy), August 1997;
- Site Investigation Report – Newton Creek Segments B and C, SEH (for WDNR), September 2000;
- Preliminary Engineering Report – Newton Creek Remediation, SEH (for WDNR), November 2001;
- Site Investigation Work Plan – Newton Creek and Hog Island Inlet, SEH (for WDNR), August 2002;
- Remedial Investigation Report – Newton Creek, SEH (for WDNR), February 2003;
- Remedial Action Options Report – Newton Creek Interim Remedial Action, SEH (for WDNR), April 2003;
- Remedial Design Report – Newton Creek Interim Remedial Action, SEH (for WDNR), April 2003;
- Plans and Specifications Bidding and Construction Documents, including Addendum 1 and Attachments – Newton Creek Interim Remedial Action, SEH (for WDNR), April 2003; and
- Newton Creek Interim Remedial Action Quality Assurance Statement, SEH (for WDNR), June 2003.

3.0 Preconstruction Activities

3.1 Remedial Design

In April 2003, SEH submitted the Remedial Design Report, Plans & Specifications for Newton Creek Interim Remedial Action. The remedial design included methodology and sequencing for removal of contaminated sediments from Newton Creek, Segments B through K.

Visual identification of contaminated sediments in the creek channel was specified as the criteria for identifying the limits of remediation. Impacted floodplain soils were covered by approximately 12 to 18 inches of clean soils and were not addressed during the Interim Remedial Action because of the limited ecological and human health risks identified associated with these soils.

3.2 Access Agreements

Prior to beginning construction activities, SEH obtained access agreements from riparian property owners along Newton Creek and other property owners where construction equipment access was required. The access agreements allowed for use of construction equipment on the affected properties, removal of contaminated materials, and site restoration. Table 1, "Removal Zone Property Owners," presents the list of property owners immediately adjacent to the Remedial Action. The owners of adjacent properties are identified on Figure 3, "Site Detail – Segments A-C," Figure 4, "Site Detail – Segments C-G," and Figure 5, "Site Detail – Segments G-K."

3.3 Permit Acquisition

The following permits were obtained by SEH prior to beginning construction in order to allow the proposed remediation activities at the site:

- USACE General Permit GP-LOP-98-WI, Section 404;
- WDNR Form 1600-1 – Environmental Analysis and Decision on the need for an Environmental Impact Statement;
- WDNR Form 3400-161 – WPDES Notice of Intent;
- WDNR Form 3500-53C – Chapter 30.19 Grading Permit;
- WDNR Form 4500-168 – Notification to Treat or Dispose of Petroleum Contaminated Soil and Water;
- City of Superior Street Right-of-Way Access permit;
- City of Superior Street Right-of-Way Excavation Permit.

3.4 Bidding Process

The Remedial Design Report, Plans & Specifications for Newton Creek Interim Remedial Action (SEH, April 2003), access agreements, and permit documents were assembled as contract documents for a public bid process led by the State of Wisconsin. Bids were received on May 2, 2003 and Onyx Special Services was selected as the successful bidder to perform the interim remedial action.

3.5 Quality Assurance Plan

The Construction Quality Assurance Plan for Newton Creek Interim Remedial Action, prepared by SEH in June 2003, outlines procedures for visual identification of contaminated sediments and determination of removal zones.

4.0 Construction Documentation

4.1 Contractors and Materials Sources

The following contractors and materials sources were used for completion of the interim action.

General Contractor:	Onyx Special Services Inc. 1620 25th Avenue North Wisconsin Rapids, WI 54495
Solid Waste Disposal:	BFI/Lake Area Landfill W5987 County Hwy D Sarona, WI 54870
Breaker Run Supplier:	J. Kimmes Construction Kimmes Quarry Superior, WI 54880
Streambed Stone Supplier:	Iron River Sand & Gravel, Inc. 65990 Primrose Lane Iron River, WI 54847

4.2 Site Preparation

Several site preparation activities were performed by the contractor at the onset of site construction. These activities were designed to prepare the site for construction and to minimize environmental impacts during construction. The preconstruction activities are described in the following subsections.

4.2.1 Sediment Trap Installation

Prior to beginning sediment excavation and removal, a sediment trap was constructed at the northern (downstream) end of the proposed construction area. The sediment trap consisted of a riprap-lined excavation area at the north end of Segment K just before Newton Creek discharges to the culvert passing under Highway 2. A silt fence was also constructed across the mouth of the culvert to minimize downstream migration of disturbed sediments beyond this point during construction.

4.2.2 Utility Clearance

Site utilities were cleared with Diggers Hotline prior to the onset of subsurface construction activities. The utility representatives identified some utilities (e.g., high-pressure gas line, fiber optic cable) that either required excavation or oversight by a utility representative while subsurface work was conducted in this area. Utility location markings were maintained by the contractor during construction.

4.2.3 Site Controls and Amenities

Prior to beginning contaminant excavation, a secure area was established on the south side of Segment B adjacent to the Dome Petroleum site. A locked gate was maintained at this location, and the area was fenced. This location was used to temporarily store stockpiled soils, construction equipment, the

job trailer, and temporary sanitary facilities. The secure area in Segment B is identified on Figure 3.

4.2.4 Temporary Access Roads

Temporary access roads were installed to allow construction equipment access to the entire length of a given Segment where contaminant removal was being performed without becoming immobilized, and to minimize the use of public roads. Gravel was placed in sloped or soft locations by the contractor during access road construction. The majority of the gravel was removed by the contractor upon completion of remediation in a given segment. Specifically approved access routes are identified on Figures 3 and 4.

4.2.5 Vegetation Removal

Vegetation along the portion of a given segment that was to be remediated (e.g., the creek bed and immediately adjacent slopes) was cleared by the contractor prior to beginning excavation of that segment. A minimal amount of vegetation was also cleared during construction of access roads. The cleared trees and brush were disposed offsite by the contractor. Portions of vegetation extending below ground (e.g., roots and stumps) were excavated and disposed as waste.

4.3 Contaminated Sediment Excavation and Disposal

A total of 7,303.71 tons of impacted sediment and soil were removed from Segments B through K of the Newton Creek system during the Interim Action from July through September 2003. Approximately 100 additional tons of contaminated sediment were removed from culverts below BNSF railroad between July and August 2004. The impacted sediments were disposed offsite at BFI/Lake Area Landfill in Sarona, Wisconsin. Appendix A, "Newton Creek Disposal Log," documents sediment and soil removed in 2003 from Segments B through K.

Photographs of the remedial activities are included in Appendix B, "Photographs."

The following subsections provide details of the remediation process.

4.3.1 Base Flow Diversion

Prior to initiating excavation activities in a given removal zone, the base flow of water was diverted and standing water was allowed to drain. The water was diverted using a large pump placed at the upstream end of the removal zone, and a discharge pipe extending downstream to below the removal zone. The pump had adequate capacity to divert the entire flow of Newton Creek during base flow conditions. Excavation work was not performed during periods when storm discharge added to the base flow exceeded the discharge capacity of the diversion system. Excavation work was not performed if the base flow diversion system was not in operation.

4.3.2 Culverts

The culverts connecting Newton Creek beneath roads, railways, and utilities were cleared of sediments during the Interim Action by flushing. The sediment and debris removed from the culverts were disposed as solid waste.

Due to delays in acquiring property access permission, the culverts beneath the BNSF railroad were not cleaned in 2003. Onyx returned to the site in 2004 and cleaned approximately 200 feet of culverts beneath the BNSF railroad, utilizing the same techniques described for the major removal action in 2003. Approximately 100 additional tons of contaminated sediment were removed from culverts below BNSF railroad between July and August 2004.

4.3.3 Stabilization

Soils and sediments removed from the creek that were too wet to transport via truck to the landfill facility were temporarily stockpiled in the contractor's locked storage yard. The wet soils were stabilized as necessary using wood flour to minimize the spread of contamination through spillage during transport.

4.3.4 General Removal

Visually observable contaminated creek sediments and adjacent contaminated flood plain soils were removed from the remediation area. Visually observable contamination was determined by one or more of the following:

- Presence of black to grayish-black to gray colored samples, portions of samples, or colored materials adhering to the sampling equipment;
- Presence of black to grayish-black to gray colored materials in situ;
- Presence of oil-related sheening on water, sediment, or soil surface observed in situ or during any field or sampling activity.

Secondary methods of observation that were used to support contamination determination included:

- Elevated photoionization detector (PID) or flame ionization detector (FID) readings;
- Presence of petroleum or hydrocarbon odors associated with a colored substrate.

For each segment, all deposited unconsolidated sediments were removed, except in the upstream portion of Segment H, where contaminants were not observed during the investigation. Some additional contaminated floodplain soils were removed from the banks of the creek based on field observations during the excavation process.

The sediments and soils were excavated using a track-mounted backhoe. An SEH representative was present during the removal activities to identify the limits of the excavation and record pre- and post-remediation elevations at designated transects.

The contaminated media was then hauled either to the staging area in the contractor's locked and secured onsite yard, or directly by truck to the landfill for disposal. Some contaminated soil overlain by visually clean soil was left in place per the remedial design. Surficial refuse within the area of remediation (e.g., tires, debris) was also removed and disposed as solid waste.

The side-slopes of the excavation area were generally graded to an approximate slope of 2(H) to 1(V) after the impacted material had been removed.

Though contaminated sediments were removed to the extent possible from culverts connecting Newton Creek beneath roads, railways, and utilities, in order to maintain the structural integrity of these structures, extensive excavation of the soils near the culverts was not possible. It is therefore likely that subsurface contamination may remain in the soils near these structures.

Site features are identified on Figure 2.

4.3.5 Disposal

A total of 7,303.71 tons of contaminated sediments and soils were removed from the site during the general removal process at Segments B through K. The soils were hauled by truck to BFI/Lake Area Landfill in Sarona, Wisconsin by licensed special waste haulers and disposed as non-hazardous special waste. Weight tickets were used to confirm the quantity removed from the site and were provided to WDNR in the project pay applications.

4.3.6 Segment Specific Notes

The following sections describe field conditions noted during excavation of specific sections.

4.3.6.1 Segment B

The original culvert near transect BV was found to be badly deteriorated and no longer functioning properly. Upon verbal approval from the WDNR, the culvert was replaced.

A damaged, abandoned telephone line was uncovered along with a high pressure gas line and a fiber optic cable. The gas line, located approximately 4.5 feet below the creek bed, was hand excavated. Glass, metal, trash and wood were present in the creek near transect BVIII.

Approximately six to eight treated railroad ties were uncovered and removed in Segment B (4641.614 lat, 9203.402 long). See Figures 2 and 3 for segment features.

In order to maintain the structural integrity of the culvert connecting Newton Creek beneath the railroad at the Segment A/B intersection, subsurface contamination likely remains in place in soils under the structure. Areas where visual contamination is known or likely to be remaining in site soils after the interim action is detailed on Figures 2 and 3.

4.3.6.2 Segment C

Soft, unstable, contaminated bank materials in Segment C were found to slough off and mix readily with the contaminated creek sediments, making removal of just the creek-bed materials difficult. Low-level areas of Segment C were found to be heavily saturated with oil. Underlying materials in the heavily contaminated areas of the bank were found to seep product when exposed. Where obvious contamination was left in place, native clay soils

found beneath the sediments were pushed up against the banks to prevent seepage of contaminants into the creek. See Figure 2 for segment features.

In order to maintain the structural integrity of the culvert connecting Newton Creek beneath the railroad at the Segment C/D intersection, subsurface contamination likely remains in place in soils under the structure. Areas where visual contamination is known or is likely to be remaining in site soils after the interim action are detailed on Figures 2 and 4.

4.3.6.3 Segment D

Heavy, widespread contamination was encountered west of the creek at transect DI on the O'Brien property. Logs and wood debris were noted near the old beaver house area. The DI and DII areas were excavated aggressively. Widespread contamination and soft bank soils were also noted in transects DIV and DV. As in the previous segment, where obvious contamination was left in place, native clay soils found beneath the sediments were pushed up against the banks to prevent seepage of contaminants into the creek.

A small dump site (<0.5 acres) was identified at transect DIV on the City of Superior right-of-way and on Douglas County property. Surficial waste appeared to be cans and broken glass. Onyx grubbed and graded the waste area and installed a vegetative cap over the waste. The cap included six inches of topsoil, erosion control mat, and seeding. The work was completed, via change order, in August 2004. See Figure 2 for segment features.

Based on excavation documentation, it is likely that subsurface contamination remains in place in floodplain soils west of the creek at transects DI (O'Brien property), and on both sides of the creek at transects DIV and DV.

In order to maintain the structural integrity of the culvert beneath the railroad at the Segment C/D intersection and under the road at East Eleventh Street (Segment D/E intersection), subsurface contamination likely remains in place in soils under the road. Areas where visual contamination is known or is likely to be remaining in site soils after the interim action are detailed on Figures 2 and 4.

4.3.6.4 Segment E

Very heavy, wet contamination with a sheen and strong odor was encountered in Segment E. See Figure 2 for segment features.

Based on excavation documentation, visual contamination was removed from this segment. However, in order to maintain the structural integrity of the culvert under the road at West Eleventh Street (Segment D/E intersection), subsurface contamination likely remains in place in soils under the road. Areas where visual contamination is known or is likely to be remaining in site soils after the interim action are detailed on Figures 2 and 4.

4.3.6.5 Segment F

Thick, tar-like contamination was encountered on the north creek bank at transect FI. The culvert running under the railroad at transect FVII was found

to be badly deteriorated and separated from the concrete end. In order to maintain structural integrity of the railroad bed, the culvert was not replaced during the interim action. See Figure 2 for segment features.

Based on excavation documentation, it is likely that subsurface contamination remains in place in floodplain soils on the west side of the creek at transect FI and both sides of the creek at transect FIII. In addition, in order to maintain the structural integrity of the culvert connecting Newton Creek beneath the railroad at Segment FV and the Segment F/G intersection, subsurface contamination likely remains in place in soils under the structure. Areas where visual contamination is known or is likely to be remaining in site soils after the interim action are detailed on Figures 2 and 4.

4.3.6.6 Segment G

Not as much contamination was noted in this segment as compared to previous segments. Excavation of Segment G was uneventful.

Based on excavation documentation, it is likely that subsurface contamination still remains in place in floodplain soils on the west side of the creek at transect GIII. In order to maintain the structural integrity of the culvert connecting Newton Creek beneath the railroad at the Segment F/G intersection and the culvert under the road at East Seventh Street (Segment G\H intersection), subsurface contamination likely remains in place in soils under these structures.

See Figure 2 for segment features. Areas where visual contamination is known or likely to be remaining in site soils after the interim action is also detailed on Figures 2, 4, and 5.

4.3.6.7 Segment H

Visual observation of contamination was not present at transects HI and HII, therefore, no excavation of sediments or creek bank was conducted. Excavation of the remainder of the segment was uneventful with visually contaminated materials being removed.

See Figure 2 for segment features.

In order to maintain the structural integrity of the culverts under the roads at East Seventh Street (Segment G\H intersection) and East Sixth Street (Segment H/I intersection), subsurface contamination likely remains in place in soils under these structures. Areas where visual contamination is known or is likely to be remaining in site soils after the interim action are detailed on Figures 2 and 5.

4.3.6.8 Segment I, Segment J, Segment K

Most of the creek bed material was removed from Segment I, Segment J, and Segment K. Concrete chunks and miscellaneous debris were noted in these segments near the streets. Visually contaminated materials have been removed from these segments.

See Figure 2 for segment features.

In order to maintain the structural integrity of the culverts under the roads at East Sixth Street (Segment H/I intersection), East Fifth Street (Segment I/J intersection), East Fourth Street (segment J/K intersection), and U.S. Highway 2 (East Second Street - Segment K/L intersection) subsurface contamination likely remains in place in soils under these structures. Areas where visual contamination is known or is likely to be remaining in site soils after the interim action are detailed on Figures 2 and 5.

4.4 Site Restoration

Site restoration activities included the backfilling of the remediated creek channel with breaker run and streambed stone, installation of coir roll at outside creek bends, revegetation of the creek bank and disturbed areas, and replacement of cleared trees and brush.

4.4.1 Channel Restoration

The excavated channel was graded to design slopes by the contractor and then filled to approximate original streambed grade with breaker run overlain by streambed stone. The breaker run consisted of crushed basalt pieces up to four inches in diameter. A total of 2,929.32 tons of breaker run were used on the project. The breaker run provides a stable streambed and a base for the streambed stone so it does not settle into the underlying soils.

The breaker run was then overlain by a relatively thin layer of streambed stone. The streambed stone consisted of rounded gravel and cobbles ranging in size from approximately two to six inches in diameter. The streambed stone was used to provide aesthetics to the streambed. A total of 520.99 tons of streambed stone were used on the project. Documentation of stone materials can be found in Appendix C, "Construction Quantities Lists."

Fibrous stabilization materials (coir rolls) were placed along the outside turns of the streambed to prevent future erosion or stream rerouting before revegetation could occur. A total of 292 Coir rolls were used on the project to stabilize the streambed. The Coir rolls are ten feet long and are secured into place with pins. Documentation of Erosion Control Materials can be found in Appendix C.

4.4.2 Culvert Outlets

All culvert outlets located within the Interim Action area were backfilled with clean graded riprap. The riprap consisted of basalt pieces ranging in size from approximately six to twelve inches in diameter. A total of 292.65 tons of riprap were used on the project. Documentation of stone materials can be found in Appendix C.

4.4.3 Revegetation

The creek bank and disturbed over-bank areas were revegetated to engineered contours in accordance with the revegetation plan provided in the remedial design. The disturbed area above the water line was covered with "Erosion Control Revegetative Mats" (ECRM). The ECRM were constructed of organic material and impregnated with dormant seeds. A total of 10,536.9 square yards of ECRM were used on the project. Documentation of Erosion Control Materials can be found in Appendix C.

The progress of revegetation was monitored during construction and 60 days after completion of construction. Areas where damage had occurred or where revegetation was not proceeding (e.g., a vandalized/burned portion of Segment D) were covered with an additional section of ECRM and re-seeded.

Trees and shrubs were transplanted into the Interim Action area upon completion of remediation in accordance with the remedial design.

SEH and the WDNR conducted a final site inspection in November 2006 to confirm that the restoration was complete.

5.0 Post-Remediation Monitoring

Post-remediation monitoring activities for the Newton Creek Segment B through L areas included chemical analysis of sediments and macroinvertebrate benthic organism population studies as part of an on-going effort to evaluate the restoration and health of the aquatic system habitat. The purpose of post-remediation monitoring is to establish a post-remediation baseline in order to compare the previous 10 years of data and future monitoring efforts. Sampling locations are identified on Figure 2. Sampling point coordinates are presented on Table 2, "Post-Remediation Monitoring Sampling Point Coordinates."

The rationale for the selection of the sampling locations is that previous testing was conducted at these locations in 1993, 1994, and 2002, and thus provides a basis for comparison of results.

5.1 Sediment Analytical Results

5.1.1 October 2004

In October 2004, sediment was collected from sediment traps located at six locations in the creek (Segments A, B, D, G, K, and L) and was analyzed for historically present contaminants (PAHs, diesel range organics, heavy metals). Post-remediation total PAH contaminant concentrations in the sediments were all less than 0.8 mg/Kg, which is considerably less than the St Louis River AOC Consensus-Based Level 1 Sediment Quality Target of 1.6 ug/Kg. Sediment sample analytical results are summarized in Table 3, "Post-Remediation Monitoring Sediment Analytical Results."

Laboratory results are included in Appendix D, "Laboratory Analytical Reports."

5.1.2 August 2006

Trough sediment traps and Hess stream bottom samplers were installed at six locations within the Newton Creek system (Segments A, B, D, F, G, and L). Samples at these locations were collected on August 16, 2006.

Sediments were collected for the analyses of the 16 individual priority PAHs and the concentrations of the individual PAHs summed to yield a Total Polycyclic Aromatic Hydrocarbons (TPAH) value. In addition, sediments were analyzed for lead and total organic carbon (TOC).

Sediment sample analytical results are summarized in Table 3.

Ranges of concentrations for sediment samples are shown below:

- TPAH concentrations within Newton Creek range from below laboratory detection limits to 0.224 mg/Kg; the site-specific TPAH remediation target for the site is the MacDonald Consensus-Based Sediment Quality Guideline Value for TPAH of 1.6 mg/Kg.
- Total lead results within Newton Creek range from 14 mg/Kg to 43 mg/Kg.
- TOC results within Newton Creek range from 20,000 mg/Kg to 77,000 mg/Kg.

The duplicate sediment samples collected at Newton Creek Segment A showed good correlation for TPAH and total lead, while correlation of TOC results was poor. However, the correlation seen is typical for this site due to variability in the sediment samples.

Laboratory results are included in Appendix D.

5.2 Macroinvertebrate Population Studies

5.2.1 October 2004

In late October 2004, macroinvertebrate samples were collected from six locations in the creek (Segments A, B, D, F, G, and L). Significant post-remediation improvements in the benthic macroinvertebrate community were identified, including increases in taxa richness and diversity and the appearance of sensitive species. A detailed report is included in Appendix E "Macroinvertebrate Population Studies."

5.2.2 August 2006

August 2006 Sediments collected in the Hess samplers at six locations within the Newton Creek system (Segments A, B, D, F, G, and L) were submitted to UW–Lake Superior Research Institute (LSRI) for benthic macroinvertebrate identification and enumeration. Five replicate samples were collected at each sampling location.

Sediment samples were collected on June 6-7, 2006 for this evaluation. Details of the procedures and results are contained in LSRI's report found in Appendix E, "Macroinvertebrate Population Studies." The report includes evaluation and comparison of previous surveys conducted since 1993 at the Newton Creek and Hog Island Inlet sites.

5.2.3 Newton Creek Status

Segment A

This segment of Newton Creek was not included in the reclamation efforts conducted in 2003. The overall taxa richness value remained consistent with that observed in 2003. However, the density of total organisms was decreased as compared to 2003, but was higher than the lowest value observed in 2000. Differences may be explained by seasonal differences in macroinvertebrate abundance.

Segment B, D, F, and G

The fauna at these four segments were similar to each other and are comparable to that observed in 2003. Taxa richness increased at all four sites along with densities of total organisms. These represent a drastic difference as compared to studies conducted prior to creek reclamation. Notable observations include:

- dramatic increases in black flies and snails
- the first time observation of sowbugs, larval beetles in several different families, a mayfly species, crayfish, and a member of the snail family.

In general, observations in these segments indicate that the common fauna has changed from two major groups (midges and worms) and 2 to 10 different taxa, to a fauna that has increased to five major groups with 10 to 25 taxa. Increased macroinvertebrate diversity indicates a positive step toward improved water quality.

Segment L

Fauna in this segment has decreased in both taxa richness and density. This decrease is likely the result of recent reclamation activities, placement of new stream bottom substrate, and no growth of submerged and emergent vegetation. This segment is in the early stages of post-reclamation and recolonization will take some time.

6.0 Field Notes and Records

Additional photographs, field observation and survey notes, permits, correspondence, and contractor payment applications with supporting quantity documentation are currently stored in SEH files and will remain there for approximately 12 years after project close-out.

7.0 Standard of Care

This document was developed in accordance with generally accepted professional practice at this time and location. Other than this, no warranty is implied or intended.

GGC/JEG/ls/MJB

List of Tables

Table 1

Removal Zone Property Owners

Property Owner	Segment(s)
Burlington Northern Santa Fe (BNSF)	Culverts between A-B, C-D, F-G
Dome Petroleum	B
Douglas County	D,E,F,G,H,K
Enbridge Energy	C
Granberg, Gary	E
O'Brien, Claudia-Jean	D
Superior, City of (parcel)	I, J, K
Superior, City of (RoWs)	B thru K
Union Pacific Railroad	F

Table 2
Post-Remediation Monitoring
Sampling Point Coordinates

	Douglas County Coordinates	
Newton Creek	X	Y
Segment A	157468.786	295159.932
Segment B	158985.444	295627.686
Segment D	159653.293	297242.262
Segment F	160138.328	297664.510
Segment G	160720.602	297729.172

Table 3
Post-Remediation Monitoring
Sediment Analytical Results

Analytical Parameters	Site-specific Remediation Target	NC Seg. A Sed. Trap	NC Seg. A Sed. Trap	NC Seg. A-dup. Sed. Trap	NC Seg. B Sed. Trap	NC Seg. B Sed. Trap	NC Seg. D Sed. Trap	NC Seg. D Sed. Trap	NC Seg. F Sed. Trap	NC Seg. G Sed. Trap	NC Seg. G Sed. Trap	NC Seg. K Sed. Trap	NC Seg. K-dup. Sed. Trap	NC Seg. L Sed. Trap	NC Seg. L	NC Seg. L Sed. Trap
		09/17/04	08/16/06	08/16/06	09/17/04	08/16/06	09/17/04	08/16/06	08/16/06	09/17/04	08/16/06	09/17/04	09/17/04	09/17/04	06/15/06	08/16/06
DRO (mg/Kg)	40	--	--	260	--	36	--	--	19	--	<7.7	12	310	--	--	
PAHs (ug/Kg)																
Acenaphthene		<5.8	<10	<12	<7.2	<18	<10	<26	<24	<7.9	<22	<7.2	<6.3	<6.0	<4.4	<15
Acenaphthylene		<20	<10	<12	<25	<18	<35	<25	<23	<28	<21	<26	<22	<21	<4.3	<15
Anthracene		13	24	22	45	<22	15	<31	<28	15	<26	19	16	21	5.7	<19
Benzo(a)Anthracene		<45	<18	<21	<57	<32	<79	<46	<42	<62	<39	<57	55	<47	7.9	<28
Benzo(a)Pyrene		<37	18	20	<46	<18	<64	<25	30	50	<21	60	62	49	8.2	<15
Benzo(b)Fluoranthene		<30	17	17	39	<17	<52	<24	29	56	<21	63	68	53	7.8	<15
Benzo(k)Fluoranthene		<40	14	16	<50	<19	<70	<27	<24	<55	<22	66	71	<42	7.9	<16
Benzo(ghi)Perylene		<20	21	30	43	<22	<35	<31	28	33	<26	26	28	23	6.4	<19
Chrysene		<42	20	21	55	<27	<73	<38	58	<57	<32	64	71	83	12	<23
Dibenzo(a,h)Anthracene		<12	<9.6	<11	<15	<17	<21	<24	<22	<16	<20	<15	<13	<13	<4.1	<14
Fluoranthene		<35	21	32	64	<18	<60	<25	30	92	<21	120	130	75	14	23
Fluorene		7.3	<12	<14	<6.0	<21	9.0	<30	<27	7.4	<25	<6.1	6.3	15	<5.1	<18
Indeno(1,2,3-cd)Pyrene		<19	11	14	<24	<15	<34	<22	<20	29	<19	24	27	<20	5.2	<13
1-Methyl Naphthalene		9.4	11	<12	27	<18	51	<26	<24	13	<22	20	22	16	5	<16
2-Methyl Naphthalene		<12	11	<13	26	<19	27	<27	<25	<16	<23	20	<13	<12	7.6	<16
Naphthalene		<9.0	<14	<16	15	<24	<16	<35	<32	<12	<30	19	11	<9.3	<5.9	<21
Phenanthrene		<21	14	21	40	<18	<36	<26	<23	43	<22	66	72	49	13	<15
Pyrene		<45	26	31	64	<15	<79	<21	40	77	23	110	120	110	29	22
TOTAL PAHs (ug/Kg)	1,610	29.7	208	224	418	ND	102	ND	215	415	23	677	759	494	129.7	45
Metals (mg/Kg)																
Lead	50	24	43	39	60	17	43	23	33	45	37	70	29	30		
Chromium		49	--	--	45	--	32	--	--	37	--	32	34	29	14	29
Other (mg/Kg)																
TOC as NPOC		9400	51000	30000	71000	43000	46000	47000	77000	32000	58000	26000	22000	37000		
Nitrogen, Ammonia		99	--	--	130	--	240	--	--	170	--	110	84	92	20000	31000
Oil & Grease, Total Recoverable		890	--	--	2000	--	1300	--	--	1700	--	760	590	560	--	--
															--	--

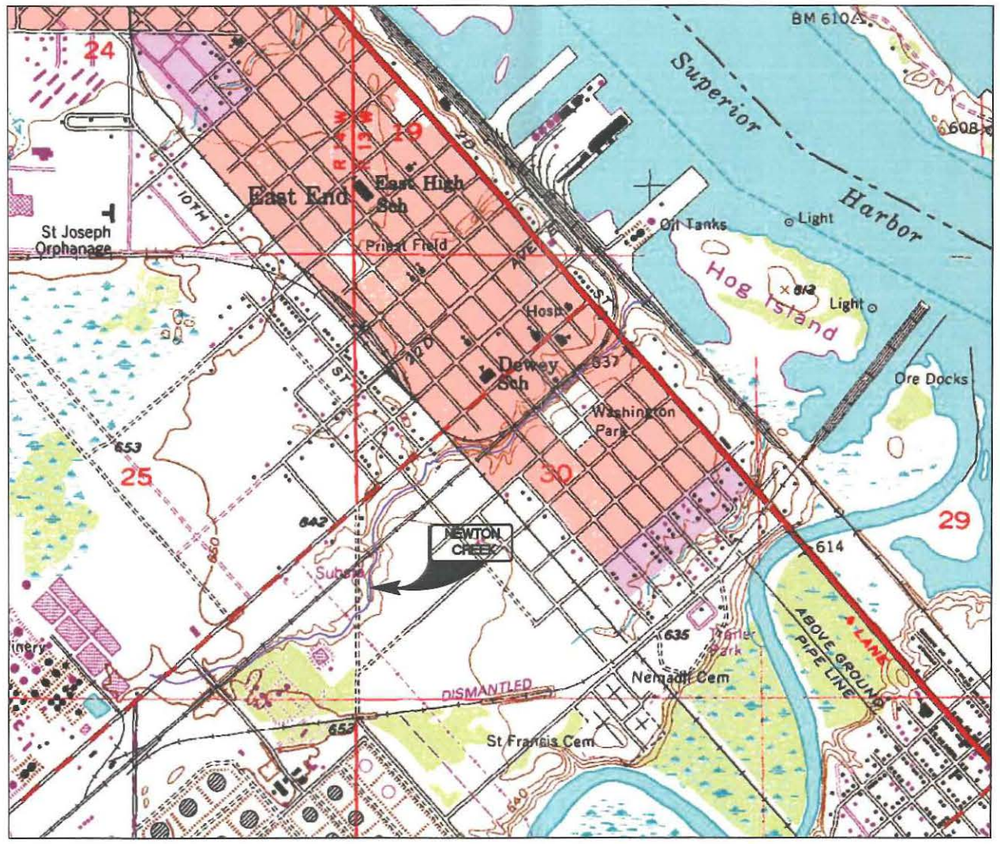
BOLD – exceeds site-specific remediation target for project
ug/Kg – micrograms per kilogram
mg/Kg – milligrams per kilogram
-- - Not analyzed

Compiled by: JEG, GGC Checked by: GGC, NG

Figures

NEWTON CREEK INTERIM REMEDIAL ACTION
CONSTRUCTION AND POST-REMEDIATION DOCUMENTATION REPORT
WISCONSIN DEPARTMENT OF NATURAL RESOURCES
SUPERIOR, WISCONSIN

COUNTY LOCATION MAP



REPRODUCED FROM
USGS SUPERIOR QUADRANGLES
WISCONSIN – DOUGLAS CO. 7.5 MINUTE SERIES
1954 PHOTOREVISED 1983

SCALE IN FEET
0 250 500 1000 2000

FIGURE INDEX

PREPARED BY:

SHORT ELLIOTT HENDRICKSON, INC.
CHIPPEWA FALLS, WISCONSIN

DRAWING DIRECTORY:

NO.	DATE	ISSUE/REVISIONS	DRAWN BY		DESIGN		QC CHECK	
1	09/11/07	INTERIM REMEDIAL ACTION	RJH	09/07	RJH	09/07	GC	09/07

SEH

NEWTON CREEK INTERIM REMEDIAL ACTION
CONSTRUCTION AND POST-REMEDIATION DOCUMENTATION REPORT
SUPERIOR, WISCONSIN

FIGURE 1
SITE LOCATION

PROJ. NO. WIDNR9905.03
DATE 09/11/07

Legend

- Sampling Locations
- Railroads
- Newton Creek
- Creek Segments
- Site Features of Note
- Potential Residual Contamination at Culverts and Trestles
- Subsurface Visual Contamination Remaining After Interim Action

N W E S

0 125 250 500 750 1,000 Feet

Segment A
Segment B
Segment C
Segment D
Segment E
Segment F
Segment G
Segment H
Segment I
Segment J
Segment K
Segment L

Site A
Site B
Site D
Site F
Site G
Site J

Location of 0.5 Acre Dump
Logs and Wood Debris Near Old Beaver House
Contamination Likely Under Bank
Trash Removed
Railroad Ties
Utilities Found During Excavation (Gas, Phone, Fiber Optic)

E 14TH ST
E 11TH ST
E 10TH ST
E 8TH ST
E 7TH ST
E 6TH ST
E 5TH ST
E 4TH ST
E 21ST ST
24TH AVE E
26TH AVE E
27TH AVE E

NO.	DATE	ISSUES/REVISIONS	DRAWN BY		DESIGN		QC CHECK	
1	08/15/07	DRAFT: FIGURE 2 - WISCONSIN WETLAND INVENTORY MAP	RJH	08/07	RJH	08/07	CJJ	08/07

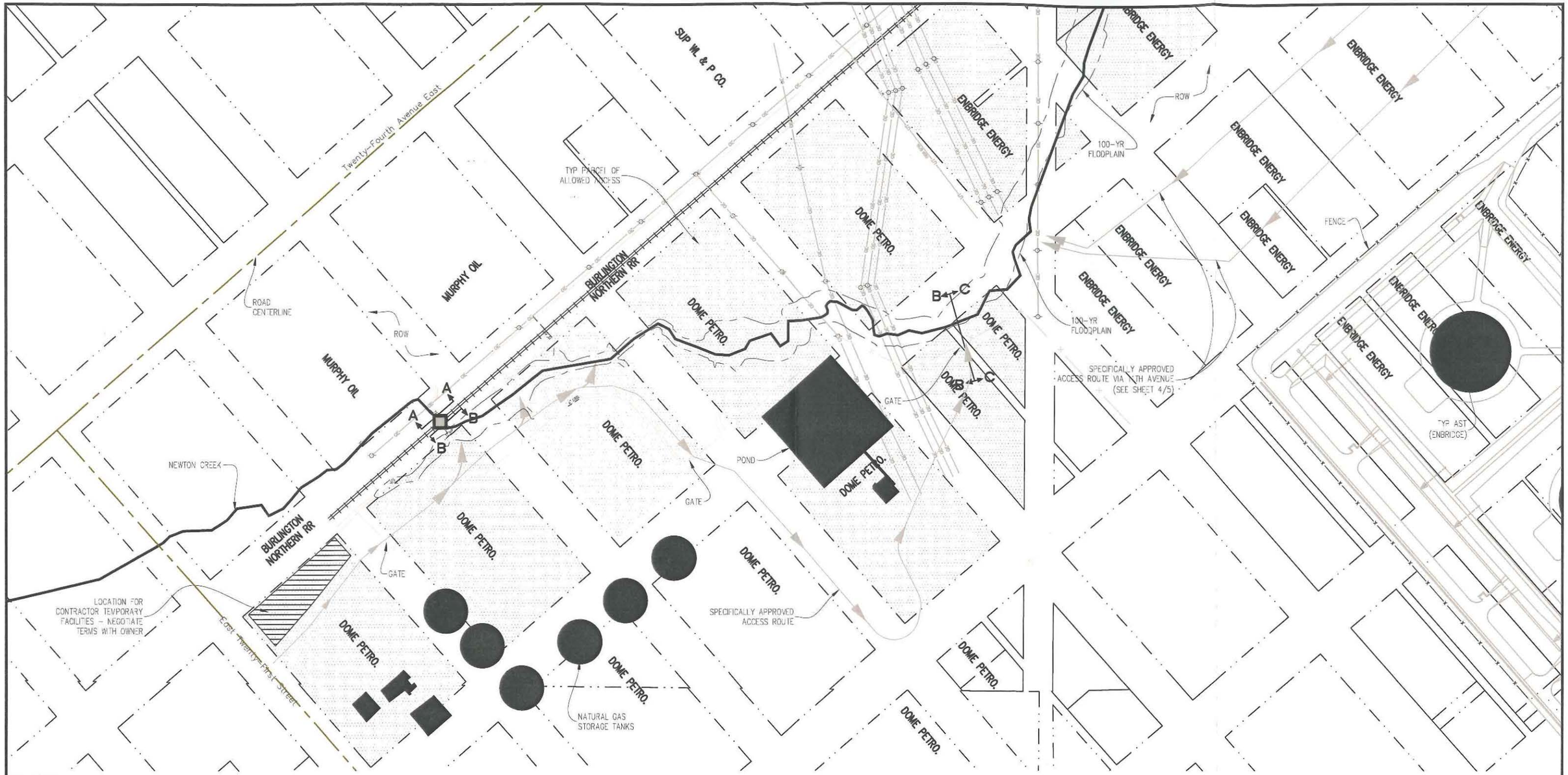
SEH

NEWTON CREEK INTERIM REMEDIAL ACTION
CONSTRUCTION AND POST-REMEDIATION
DOCUMENTATION REPORT
SUPERIOR, WISCONSIN

FIGURE 2
SITE FEATURES - SEGMENTS A-L

PROJ. NO. WIDNR9905.03
DATE 09/11/17

2/5



DRAWING DIRECTORY:

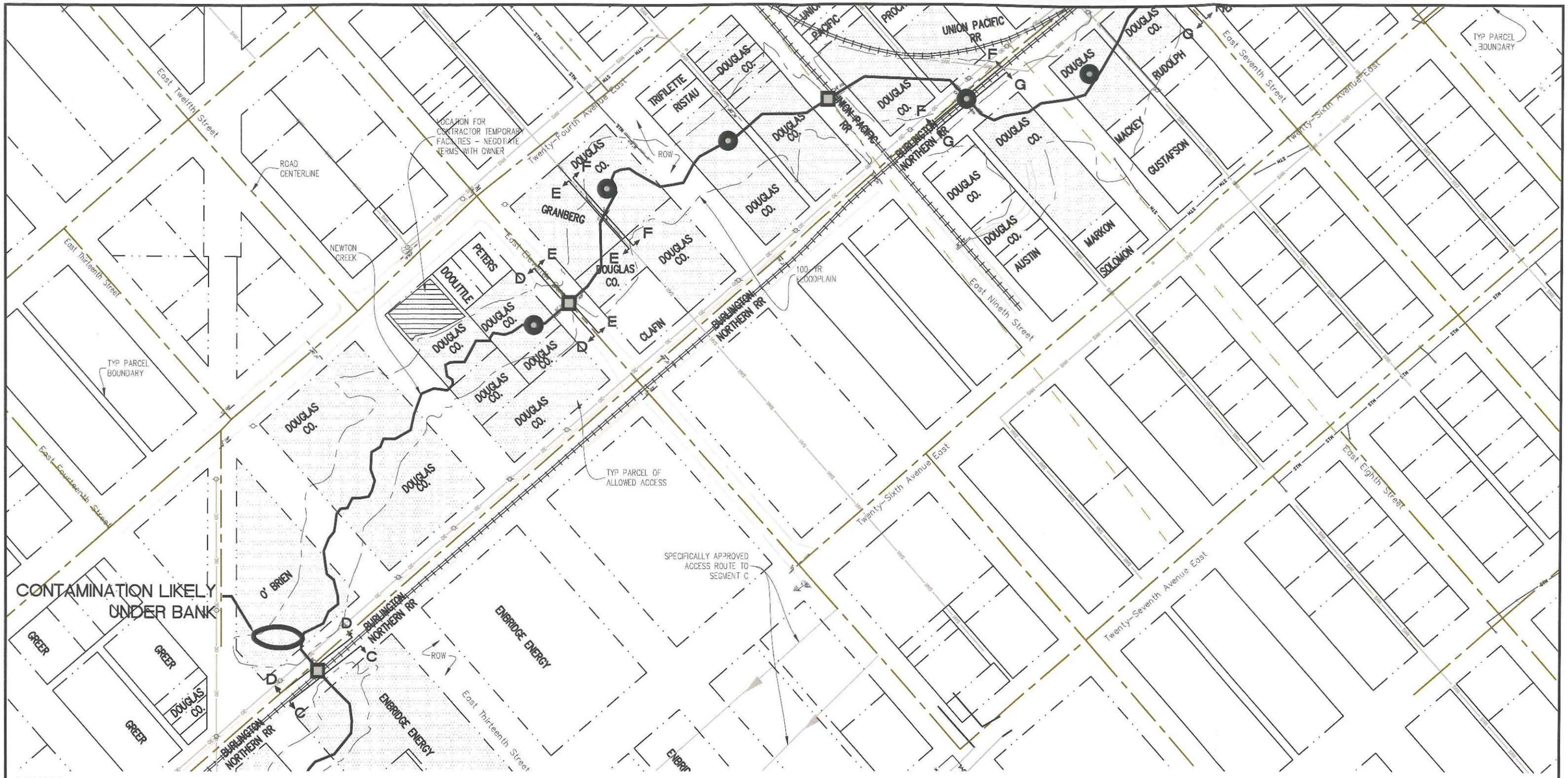
NO.	DATE	ISSUE/REVISIONS	DRAWN BY		DESIGN		QC CHECK	
1	09/11/07	INTERIM REVEDIAL ACTION	RJH	09/07	RJH	09/07	GC	09/07

SEH

NEWTON CREEK INTERIM REMEDIAL ACTION
CONSTRUCTION AND POST-REMEDIATION DOCUMENTATION REPORT
SUPERIOR, WISCONSIN

FIGURE 3
SITE DETAIL - SEGMENTS A-C

PROJ. NO. WIDNR9905.03
DATE 09/11/07



LEGEND:

■ = POTENTIAL RESIDUAL CONTAMINATION AT CULVERTS AND TRESTLES

● = SUBSURFACE VISUAL CONTAMINATION REMAINING AFTER INTERIM ACTION

N

SCALE IN FEET

0 50 100 200

DRAWING DIRECTORY:

NO.	DATE	ISSUE/REVISIONS	DRAWN BY		DESIGN		QC CHECK	
1	09/11/07	INTERIM REMEDIAL ACTION	RJH	09/07	RJH	09/07	GC	09/07

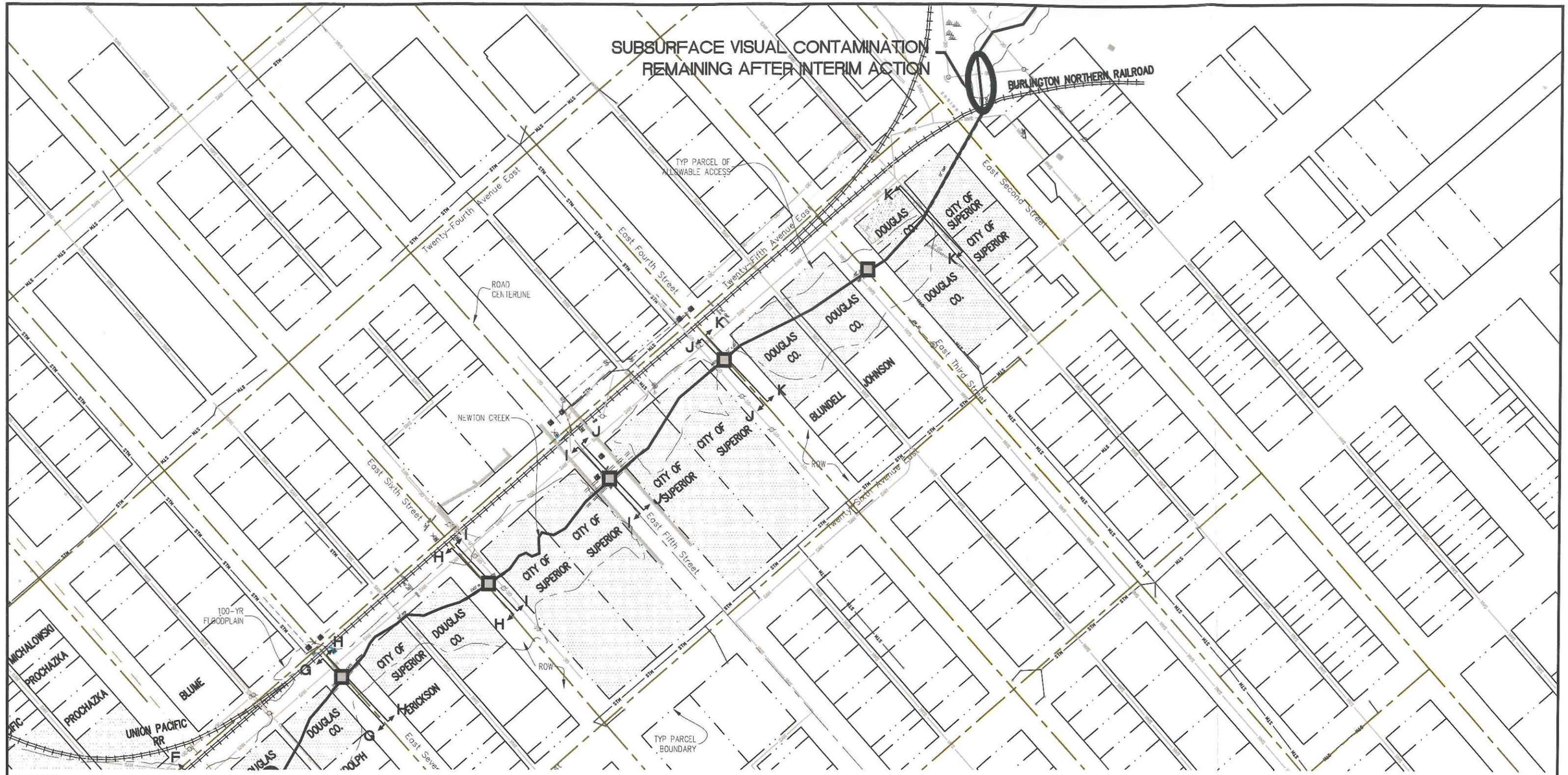
SEH

NEWTON CREEK INTERIM REMEDIAL ACTION
CONSTRUCTION AND POST-REMEDIATION DOCUMENTATION REPORT
SUPERIOR, WISCONSIN

FIGURE 4
SITE DETAIL - SEGMENTS C-G

PROJ. NO. WIDNR9905.03
DATE 09/11/07

4
5



DRAWING DIRECTORY:

NO.	DATE	ISSUE/REVISIONS	DRAWN BY		DESIGN		QC CHECK	
1	09/11/07	INTERIM REMEDIAL ACTION	RJH	09/07	RJH	09/07	GC	09/07

SEH

NEWTON CREEK INTERIM REMEDIAL ACTION
CONSTRUCTION AND POST-REMEDIATION DOCUMENTATION REPORT
SUPERIOR, WISCONSIN

FIGURE 5
SITE DETAIL - SEGMENTS G-K

PROJ. NO. WDNR9905.03
DATE 09/11/07

5
5

Appendix A

Newton Creek Disposal Log

CUSTOMER INFORMATION
From: Jul 01, 2003 To: Jul 25, 2003
Specified Customer: 3728

Facility All Facilities | DETAILED REPORT | Report Contents Inbound And Outboun

Date In	Ticket Number	Contract	Contract DescriptionReference	Billing Qty.
1 Jul 2003	085202	#L79Y35169	SILT CREEK BED M157002AL	17.31
2 Jul 2003	085274	#L79Y35169	SILT CREEK BED M156803AL	21.94
2 Jul 2003	085329	#L79Y35169	SILT CREEK BED M156802AL	21.91
2 Jul 2003	085393	#L79Y35169	SILT CREEK BED M156807AL	24.43
3 Jul 2003	085441	#L79Y35169	SILT CREEK BED M156806AL	22.29
3 Jul 2003	085499	#L79Y35169	SILT CREEK BED M156805AL	19.59
7 Jul 2003	085751	#L79Y35169	SILT CREEK BED MH702112 156935	22.89
7 Jul 2003	085755	#L79Y35169	SILT CREEK BED MH302083 156934	22.86
7 Jul 2003	085835	#L79Y35169	SILT CREEK BED M112-156933	22.81
8 Jul 2003	085986	#L79Y35169	SILT CREEK BED M156926AL	21.59
8 Jul 2003	085999	#L79Y35169	SILT CREEK BED M156943AL	23.15
8 Jul 2003	086039	#L79Y35169	SILT CREEK BED M156932AL	23.87
8 Jul 2003	086055	#L79Y35169	SILT CREEK BED M156942AL	20.98
9 Jul 2003	086080	#L79Y35169	SILT CREEK BED MH702112 -156930	23.29
9 Jul 2003	086086	#L79Y35169	SILT CREEK BED MH302083 156941	23.19
9 Jul 2003	086118	#L79Y35169	SILT CREEK BED M156931AL	23.43
9 Jul 2003	086129	#L79Y35169	SILT CREEK BED M156936AL	22.81
9 Jul 2003	086183	#L79Y35169	SILT CREEK BED M156924AL	22.52
9 Jul 2003	086194	#L79Y35169	SILT CREEK BED M156937AL	23.06
10 Jul 2003	086243	#L79Y35169	SILT CREEK BED MH702112 156925	23.64
10 Jul 2003	086244	#L79Y35169	SILT CREEK BED MH302083 156938	23.45
10 Jul 2003	086292	#L79Y35169	SILT CREEK BED MH702112L	23.45
10 Jul 2003	086302	#L79Y35169	SILT CREEK BED MH302083 156927	23.36
10 Jul 2003	086357	#L79Y35169	SILT CREEK BED MH702112 156918	23.80
10 Jul 2003	086377	#L79Y35169	SILT CREEK BED MH302083 156929	22.13
11 Jul 2003	086419	#L79Y35169	SILT CREEK BED MH702112 156914	23.23
11 Jul 2003	086476	#L79Y35169	SILT CREEK BED MH702112 1566913	23.00
12 Jul 2003	086591	#L79Y35169	SILT CREEK BED MH702112 156912	21.52
16 Jul 2003	086957	#L79Y35169	SILT CREEK BED M156911AL	22.50
16 Jul 2003	086959	#L79Y35169	SILT CREEK BED M156939AL	22.81
16 Jul 2003	087014	#L79Y35169	SILT CREEK BED M156928AL	22.67
16 Jul 2003	087021	#L79Y35169	SILT CREEK BED M156904AL	22.88
16 Jul 2003	087071	#L79Y35169	SILT CREEK BED M156919AL	23.23
16 Jul 2003	087076	#L79Y35169	SILT CREEK BED MH302083-156923	23.54
16 Jul 2003	087089	#L79Y35169	SILT CREEK BED MH702087 156899	20.97
17 Jul 2003	087131	#L79Y35169	SILT CREEK BED MH702112 156910	23.49
17 Jul 2003	087132	#L79Y35169	SILT CREEK BED MH302083 156909	22.98
17 Jul 2003	087162	#L79Y35169	SILT CREEK BED MH702087156898	22.82
17 Jul 2003	087178	#L79Y35169	SILT CREEK BED MD46 156891	23.74
17 Jul 2003	087179	#L79Y35169	SILT CREEK BED MD46 156888	24.21
17 Jul 2003	087183	#L79Y35169	SILT CREEK BED MD35 156889	24.77
17 Jul 2003	087193	#L79Y35169	SILT CREEK BED MD36 156890	25.07
17 Jul 2003	087201	#L79Y35169	SILT CREEK BED MH702112 156920	23.54
17 Jul 2003	087205	#L79Y35169	SILT CREEK BED M302083-156908	23.15
17 Jul 2003	087256	#L79Y35169	SILT CREEK BED MD48 156887	24.62
17 Jul 2003	087260	#L79Y35169	SILT CREEK BED MD36 156885	24.87
17 Jul 2003	087261	#L79Y35169	SILT CREEK BED MD35 156886	24.72
17 Jul 2003	087266	#L79Y35169	SILT CREEK BED MH302083 156907	22.16
17 Jul 2003	087275	#L79Y35169	SILT CREEK BED MH702112 156921	23.34
17 Jul 2003	087281	#L79Y35169	SILT CREEK BED MGRN 156901	23.09
18 Jul 2003	087299	#L79Y35169	SILT CREEK BED MH702112 156922	22.99
18 Jul 2003	087303	#L79Y35169	SILT CREEK BED MH702087 156897	23.06
18 Jul 2003	087305	#L79Y35169	SILT CREEK BED MD35 156882	24.71
18 Jul 2003	087304	#L79Y35169	SILT CREEK BED MD36 156883	24.67
18 Jul 2003	087306	#L79Y35169	SILT CREEK BED MD48 156884	25.22
18 Jul 2003	087347	#L79Y35169	SILT CREEK BED MH702112 156894	23.10
18 Jul 2003	087351	#L79Y35169	SILT CREEK BED MGRN 156896	22.72
18 Jul 2003	087355	#L79Y35169	SILT CREEK BED MD36 156871	24.23
18 Jul 2003	087356	#L79Y35169	SILT CREEK BED MD48 156871	24.28
18 Jul 2003	087361	#L79Y35169	SILT CREEK BED MD35 156873	24.36

CUSTOMER INFORMATION
From: Jul 01, 2003 To: Jul 25, 2003
Specified Customer: 3728

Facility All Facilities | DETAILED REPORT | Report Contents: Inbound And Outboun

Date In	Ticket Number	Contract	Contract DescriptionReference	Billing Qty.
18 Jul 2003	087400	#L79Y35169	SILT CREEK BED M702112 156893	23.19
18 Jul 2003	087413	#L79Y35169	SILT CREEK BED MGRN 156902	21.03
18 Jul 2003	087418	#L79Y35169	SILT CREEK BED MD35 156879	23.97
18 Jul 2003	087426	#L79Y35169	SILT CREEK BED MD48 156872	24.81
18 Jul 2003	087417	#L79Y35169	SILT CREEK BED MD36 156878	25.00
18 Jul 2003	087451	#L79Y35169	SILT CREEK BED M702112 156892	23.52
21 Jul 2003	087538	#L79Y35169	SILT CREEK BED MH702087 156877	22.27
21 Jul 2003	087540	#L79Y35169	SILT CREEK BED MH702112 156895	22.23
21 Jul 2003	087599	#L79Y35169	SILT CREEK BED MH702112-156868	22.70
21 Jul 2003	087618	#L79Y35169	SILT CREEK BED MGRN 156876	22.92
21 Jul 2003	087666	#L79Y35169	SILT CREEK BED M156869AL	23.55
22 Jul 2003	087683	#L79Y35169	SILT CREEK BED MH702087 156903	22.59
22 Jul 2003	087682	#L79Y35169	SILT CREEK BED MH702112 156881	23.01
22 Jul 2003	087686	#L79Y35169	SILT CREEK BED MH302083 156906	22.63
22 Jul 2003	087734	#L79Y35169	SILT CREEK BED M702112-156880	22.44
22 Jul 2003	087743	#L79Y35169	SILT CREEK BED MGRN-156900	23.00
22 Jul 2003	087748	#L79Y35169	SILT CREEK BED MGREG 156917	23.44
22 Jul 2003	087802	#L79Y35169	SILT CREEK BED MH702112 156853	23.30
22 Jul 2003	087805	#L79Y35169	SILT CREEK BED MGREG-156847	23.03
22 Jul 2003	087808	#L79Y35169	SILT CREEK BED MGRN 156849	23.43
23 Jul 2003	087848	#L79Y35169	SILT CREEK BED MH702112 156854	22.43
23 Jul 2003	087849	#L79Y35169	SILT CREEK BED MH702087 156852	22.90
23 Jul 2003	087850	#L79Y35169	SILT CREEK BED MH302083 156848	22.89
23 Jul 2003	087883	#L79Y35169	SILT CREEK BED MD36 156994	25.01
23 Jul 2003	087888	#L79Y35169	SILT CREEK BED MD35 156993	24.10
23 Jul 2003	087898	#L79Y35169	SILT CREEK BED MGREG 156855	22.57
23 Jul 2003	087906	#L79Y35169	SILT CREEK BED MRON 156858	23.27
23 Jul 2003	087908	#L79Y35169	SILT CREEK BED MAL 156851	22.46
23 Jul 2003	087945	#L79Y35169	SILT CREEK BED MD36 156995	25.18
23 Jul 2003	087944	#L79Y35169	SILT CREEK BED MD35 156996	24.69
23 Jul 2003	087943	#L79Y35169	SILT CREEK BED MD48 156992	24.44
23 Jul 2003	087948	#L79Y35169	SILT CREEK BED MGREG 156856	23.50
23 Jul 2003	087956	#L79Y35169	SILT CREEK BED MRON 156859	23.20
23 Jul 2003	087959	#L79Y35169	SILT CREEK BED MH702112 156885	23.33
23 Jul 2003	087995	#L79Y35169	SILT CREEK BED MGREG 156857	22.95
24 Jul 2003	088004	#L79Y35169	SILT CREEK BED MD36 156966	27.37
24 Jul 2003	088010	#L79Y35169	SILT CREEK BED MH702112 156864	23.08
24 Jul 2003	088012	#L79Y35169	SILT CREEK BED MH702087 156860	22.03
24 Jul 2003	088011	#L79Y35169	SILT CREEK BED MH302083 156874	23.76
24 Jul 2003	088032	#L79Y35169	SILT CREEK BED MD35 156968	24.75
24 Jul 2003	088033	#L79Y35169	SILT CREEK BED MD48 156967	24.47
24 Jul 2003	088051	#L79Y35169	SILT CREEK BED MD36 156808	24.00
24 Jul 2003	088059	#L79Y35169	SILT CREEK BED MAL 156863	22.16
24 Jul 2003	088062	#L79Y35169	SILT CREEK BED MGREG 156875	23.20
24 Jul 2003	088075	#L79Y35169	SILT CREEK BED MD48 156809	23.75
24 Jul 2003	088080	#L79Y35169	SILT CREEK BED MRON 156850	21.34
24 Jul 2003	088084	#L79Y35169	SILT CREEK BED MD35 156965	24.93
24 Jul 2003	088085	#L79Y35169	SILT CREEK BED MD48 156973	24.52
24 Jul 2003	088106	#L79Y35169	SILT CREEK BED MD36 156991	24.89
24 Jul 2003	088112	#L79Y35169	SILT CREEK BED MAL 156974	23.13
24 Jul 2003	088115	#L79Y35169	SILT CREEK BED MGREG 156905	22.58
24 Jul 2003	088133	#L79Y35169	SILT CREEK BED MD48 156998	24.20
24 Jul 2003	088145	#L79Y35169	SILT CREEK BED MRON 156861	23.46
24 Jul 2003	088150	#L79Y35169	SILT CREEK BED MD48 156820	24.44
24 Jul 2003	088151	#L79Y35169	SILT CREEK BED MD35 156819	24.75
25 Jul 2003	088171	#L79Y35169	SILT CREEK BED MD36 156821	26.48
25 Jul 2003	088173	#L79Y35169	SILT CREEK BED MH702087 156882	23.19
25 Jul 2003	088175	#L79Y35169	SILT CREEK BED MH702112 156975	23.20
25 Jul 2003	088215	#L79Y35169	SILT CREEK BED MD35 156811	24.85
25 Jul 2003	088216	#L79Y35169	SILT CREEK BED MD48 156810	24.78

CUSTOMER INFORMATION
From: Jul 01, 2003 To: Jul 25, 2003
Specified Customer: 3728

Facility: All Facilities | DETAILED REPORT | Report Contents Inbound And Outboun

Date In	Ticket Number	Contract	Contract DescriptionReference	Billing Qty.
25 Jul 2003	088217	#L79Y35169	SILT CREEK BED ND36 156812	25.04
25 Jul 2003	088219	#L79Y35169	SILT CREEK BED NAL 156976	22.53
25 Jul 2003	088238	#L79Y35169	SILT CREEK BED NRON 156985	22.20
25 Jul 2003	088285	#L79Y35169	SILT CREEK BED ND36 156814	25.15
25 Jul 2003	088286	#L79Y35169	SILT CREEK BED ND48 156813	24.22
25 Jul 2003	088283	#L79Y35169	SILT CREEK BED ND35ERIAL	25.29
25 Jul 2003	088307	#L79Y35169	SILT CREEK BED NAL 156969	22.92
25 Jul 2003	088311	#L79Y35169	SILT CREEK BED NRON 156986	22.95

Customer Total (128)

Report Total (128)

CUSTOMER INFORMATION
From: Jul 01, 2003 To: Jul 25, 2003
Specified Customer: 3728

*** REPORT SUMMARY ***

Total Tickets:	128	
Total Volume:	15,250.00	YD
Total Weight:	2,990.39	TN

CUSTOMER ACTIVITY REPORT
From: Jul 01, 2003 To: Sep 24, 2003
Specified Customer: 3728

Facility: All Facilities | DETAILED REPORT | Ticket Type: All Ticket Type

Ticket Date	Ticket Number	Contract	Truck ID	Material	Material Rate	Billing Quantity
003728-0000 ONYX						
07-01-03	085202-00	#L79Y35169	TRK1	C. SOIL		17.31 TN
07-02-03	085274-00	#L79Y35169	TRK1	C. SOIL		21.94 TN
07-02-03	085329-00	#L79Y35169	TRK1	C. SOIL		21.91 TN
07-02-03	085393-00	#L79Y35169	TRK1	C. SOIL		24.43 TN
07-03-03	085441-00	#L79Y35169	TRK1	C. SOIL		22.29 TN
07-03-03	085499-00	#L79Y35169	TRK1	C. SOIL		19.59 TN
07-07-03	085751-00	#L79Y35169	ON	C. SOIL		22.89 TN
07-07-03	085755-00	#L79Y35169	ON	C. SOIL		22.86 TN
07-07-03	085835-00	#L79Y35169	ON	C. SOIL		22.81 TN
07-08-03	085986-00	#L79Y35169	ON	C. SOIL		21.59 TN
07-08-03	085999-00	#L79Y35169	ON	C. SOIL		23.15 TN
07-08-03	086039-00	#L79Y35169	ON	C. SOIL		23.67 TN
07-08-03	086055-00	#L79Y35169	ON	C. SOIL		20.98 TN
07-09-03	086080-00	#L79Y35169	ON	C SOIL		23.29 TN
07-09-03	086086-00	#L79Y35169	ON	C. SOIL		23.19 TN
07-09-03	086118-00	#L79Y35169	ON	C. SOIL		23.43 TN
07-09-03	086129-00	#L79Y35169	ON	C. SOIL		22.81 TN
07-09-03	086183-00	#L79Y35169	ON	C. SOIL		22.52 TN
07-09-03	086194-00	#L79Y35169	ON	C SOIL		23.06 TN
07-10-03	086243-00	#L79Y35169	ON	C. SOIL		23.64 TN
07-10-03	086244-00	#L79Y35169	ON	C. SOIL		23.45 TN
07-10-03	086292-00	#L79Y35169	ON	C. SOIL		23.45 TN
07-10-03	086302-00	#L79Y35169	ON	C. SOIL		23.35 TN
07-10-03	086357-00	#L79Y35169	ON	C. SOIL		23.80 TN
07-10-03	086377-00	#L79Y35169	ON	C. SOIL		22.13 TN
07-11-03	086419-00	#L79Y35169	ON	C. SOIL		23.23 TN
07-11-03	086476-00	#L79Y35169	ON	C. SOIL		23.00 TN
07-12-03	086591-00	#L79Y35169	ON	C. SOIL		21.52 TN
07-16-03	086957-00	#L79Y35169	ON	C. SOIL		22.50 TN
07-16-03	086959-00	#L79Y35169	ON	C. SOIL		22.81 TN
07-16-03	087014-00	#L79Y35169	ON	C. SOIL		22.67 TN
07-16-03	087021-00	#L79Y35169	ON	C. SOIL		22.88 TN
07-16-03	087071-00	#L79Y35169	ON	C. SOIL		23.23 TN
07-16-03	087076-00	#L79Y35169	ON	C. SOIL		23.54 TN
07-16-03	087089-00	#L79Y35169	ON	C. SOIL		20.97 TN
07-17-03	087131-00	#L79Y35169	ON	C. SOIL		23.49 TN
07-17-03	087132-00	#L79Y35169	ON	C. SOIL		22.98 TN
07-17-03	087162-00	#L79Y35169	ON	C. SOIL		22.82 TN
07-17-03	087178-00	#L79Y35169	ON	C. SOIL		23.74 TN
07-17-03	087179-00	#L79Y35169	ON	C. SOIL		24.21 TN
07-17-03	087183-00	#L79Y35169	ON	C. SOIL		24.77 TN
07-17-03	087193-00	#L79Y35169	ON	C. SOIL		25.07 TN
07-17-03	087201-00	#L79Y35169	ON	C. SOIL		23.54 TN
07-17-03	087205-00	#L79Y35169	ON	C. SOIL		23.15 TN
07-17-03	087256-00	#L79Y35169	ON	C. SOIL		24.62 TN
07-17-03	087260-00	#L79Y35169	ON	C. SOIL		24.87 TN
07-17-03	087261-00	#L79Y35169	ON	C. SOIL		24.72 TN
07-17-03	087266-00	#L79Y35169	ON	C. SOIL		22.16 TN
07-17-03	087275-00	#L79Y35169	ON	C. SOIL		23.34 TN
07-17-03	087281-00	#L79Y35169	ON	C. SOIL		23.09 TN
07-18-03	087299-00	#L79Y35169	ON	C. SOIL		22.99 TN
07-18-03	087303-00	#L79Y35169	ON	C. SOIL		23.06 TN
07-18-03	087304-00	#L79Y35169	ON	C. SOIL		24.67 TN
07-18-03	087305-00	#L79Y35169	ON	C. SOIL		24.71 TN
07-18-03	087306-00	#L79Y35169	ON	C. SOIL		25.22 TN
07-18-03	087347-00	#L79Y35169	ON	C. SOIL		23.10 TN
07-18-03	087351-00	#L79Y35169	ON	C. SOIL		22.72 TN

Facility: All Facilities

DETAILED REPORT

Ticket Date	Ticket Number	Contract	Truck ID	Material	Material Rate	Billing Quantity
07-18-03	087355-00	#L79Y35169	ON	C. SOIL		24.23 TN
07-18-03	087356-00	#L79Y35169	ON	C. SOIL		24.28 TN
07-18-03	087361-00	#L79Y35169	ON	C. SOIL		24.36 TN
07-18-03	087400-00	#L79Y35169	ON	C. SOIL		23.19 TN
07-18-03	087413-00	#L79Y35169	ON	C. SOIL		21.03 TN
07-18-03	087417-00	#L79Y35169	ON	C. SOIL		25.00 TN
07-18-03	087418-00	#L79Y35169	ON	C. SOIL		23.97 TN
07-18-03	087426-00	#L79Y35169	ON	C. SOIL		24.81 TN
07-18-03	087451-00	#L79Y35169	ON	C. SOIL		23.52 TN
07-21-03	087538-00	#L79Y35169	ON	C. SOIL		22.27 TN
07-21-03	087540-00	#L79Y35169	ON	C. SOIL		22.23 TN
07-21-03	087599-00	#L79Y35169	ON	C. SOIL		22.70 TN
07-21-03	087618-00	#L79Y35169	ON	C. SOIL		22.92 TN
07-21-03	087666-00	#L79Y35169	ON	C. SOIL		23.55 TN
07-22-03	087682-00	#L79Y35169	ON	C. SOIL		23.01 TN
07-22-03	087683-00	#L79Y35169	ON	C. SOIL		22.59 TN
07-22-03	087686-00	#L79Y35169	ON	C. SOIL		22.63 TN
07-22-03	087734-00	#L79Y35169	ON	C. SOIL		22.44 TN
07-22-03	087743-00	#L79Y35169	ON	C. SOIL		23.00 TN
07-22-03	087748-00	#L79Y35169	ON	C. SOIL		23.44 TN
07-22-03	087802-00	#L79Y35169	ON	C. SOIL		23.30 TN
07-22-03	087805-00	#L79Y35169	ON	C. SOIL		23.03 TN
07-22-03	087808-00	#L79Y35169	ON	C. SOIL		23.43 TN
07-23-03	087848-00	#L79Y35169	ON	C. SOIL		22.43 TN
07-23-03	087849-00	#L79Y35169	ON	C. SOIL		22.90 TN
07-23-03	087850-00	#L79Y35169	ON	C. SOIL		22.89 TN
07-23-03	087883-00	#L79Y35169	ON	C. SOIL		25.01 TN
07-23-03	087888-00	#L79Y35169	ON	C. SOIL		24.10 TN
07-23-03	087898-00	#L79Y35169	ON	C. SOIL		22.57 TN
07-23-03	087906-00	#L79Y35169	ON	C. SOIL		23.27 TN
07-23-03	087908-00	#L79Y35169	ON	C. SOIL		22.46 TN
07-23-03	087943-00	#L79Y35169	ON	C. SOIL		24.44 TN
07-23-03	087944-00	#L79Y35169	ON	C. SOIL		24.69 TN
07-23-03	087945-00	#L79Y35169	ON	C. SOIL		25.18 TN
07-23-03	087948-00	#L79Y35169	ON	C. SOIL		23.50 TN
07-23-03	087956-00	#L79Y35169	ON	C. SOIL		23.20 TN
07-23-03	087959-00	#L79Y35169	ON	C. SOIL		23.33 TN
07-23-03	087995-00	#L79Y35169	ON	C. SOIL		22.95 TN
07-24-03	088004-00	#L79Y35169	ON	C. SOIL		27.37 TN
07-24-03	088010-00	#L79Y35169	ON	C. SOIL		23.08 TN
07-24-03	088011-00	#L79Y35169	ON	C. SOIL		23.76 TN
07-24-03	088012-00	#L79Y35169	ON	C. SOIL		22.03 TN
07-24-03	088032-00	#L79Y35169	ON	C. SOIL		24.75 TN
07-24-03	088033-00	#L79Y35169	ON	C. SOIL		24.47 TN
07-24-03	088051-00	#L79Y35169	ON	C. SOIL		24.00 TN
07-24-03	088059-00	#L79Y35169	ON	C. SOIL		22.16 TN
07-24-03	088062-00	#L79Y35169	ON	C. SOIL		23.20 TN
07-24-03	088075-00	#L79Y35169	ON	C. SOIL		23.75 TN
07-24-03	088080-00	#L79Y35169	ON	C. SOIL		21.34 TN
07-24-03	088084-00	#L79Y35169	ON	C. SOIL		24.93 TN
07-24-03	088085-00	#L79Y35169	ON	C. SOIL		24.52 TN
07-24-03	088106-00	#L79Y35169	ON	C. SOIL		24.89 TN
07-24-03	088112-00	#L79Y35169	ON	C. SOIL		23.13 TN
07-24-03	088115-00	#L79Y35169	ON	C. SOIL		22.58 TN
07-24-03	088133-00	#L79Y35169	ON	C. SOIL		24.20 TN
07-24-03	088145-00	#L79Y35169	ON	C. SOIL		23.46 TN
07-24-03	088150-00	#L79Y35169	ON	C. SOIL		24.44 TN
07-24-03	088151-00	#L79Y35169	ON	C. SOIL		24.75 TN
07-25-03	088171-00	#L79Y35169	ON	C. SOIL		26.48 TN

Facility: All Facilities

DETAILED REPORT

Ticket Date	Ticket Number	Contract	Truck ID	Material	Material Rate	Billing Quantity
07-25-03	088173-00	#L79Y35169	ON	C. SOIL		23.19 TN
07-25-03	088175-00	#L79Y35169	ON	C. SOIL		23.20 TN
07-25-03	088215-00	#L79Y35169	ON	C. SOIL		24.85 TN
07-25-03	088216-00	#L79Y35169	ON	C. SOIL		24.78 TN
07-25-03	088217-00	#L79Y35169	ON	C SOIL		25.04 TN
07-25-03	088219-00	#L79Y35169	ON	C. SOIL		22.53 TN
07-25-03	088238-00	#L79Y35169	ON	C. SOIL		22.20 TN
07-25-03	088263-00	#L79Y35169	ON	C. SOIL		25.29 TN
07-25-03	088285-00	#L79Y35169	ON	C. SOIL		25.15 TN
07-25-03	088286-00	#L79Y35169	ON	C SOIL		24.22 TN
07-25-03	088307-00	#L79Y35169	ON	C. SOIL		22.92 TN
07-25-03	088311-00	#L79Y35169	ON	C SOIL		22.95 TN
07-28-03	088429-00	#L79Y35169	ON	C. SOIL		22.91 TN
07-28-03	088430-00	#L79Y35169	ON	C. SOIL		22.27 TN
07-28-03	088431-00	#L79Y35169	ON	C. SOIL		24.42 TN
07-28-03	088435-00	#L79Y35169	ON	C SOIL		23.66 TN
07-28-03	088441-00	#L79Y35169	ON	C. SOIL		23.23 TN
07-28-03	088442-00	#L79Y35169	ON	C SOIL		24.37 TN
07-28-03	088489-00	#L79Y35169	ON	C SOIL		25.15 TN
07-28-03	088490-00	#L79Y35169	ON	C. SOIL		24.67 TN
07-28-03	088504-00	#L79Y35169	ON	C SOIL		24.38 TN
07-28-03	088505-00	#L79Y35169	ON	C SOIL		23.59 TN
07-29-03	088574-00	#L79Y35169	ON	C. SOIL		22.95 TN
07-29-03	088578-00	#L79Y35169	ON	C. SOIL		23.09 TN
07-29-03	088636-00	#L79Y35169	ON	C SOIL		22.85 TN
07-29-03	088637-00	#L79Y35169	ON	C. SOIL		23.45 TN
07-29-03	088688-00	#L79Y35169	ON	C SOIL		22.77 TN
07-29-03	088715-00	#L79Y35169	ON	C. SOIL		22.64 TN
07-30-03	088732-00	#L79Y35169	ON	C. SOIL		24.43 TN
07-30-03	088733-00	#L79Y35169	ON	C SOIL		25.28 TN
07-30-03	088738-00	#L79Y35169	ON	C SOIL		23.21 TN
07-30-03	088739-00	#L79Y35169	ON	C. SOIL		23.08 TN
07-30-03	088740-00	#L79Y35169	ON	C. SOIL		23.28 TN
07-30-03	088741-00	#L79Y35169	ON	C SOIL		21.77 TN
07-30-03	088786-00	#L79Y35169	ON	C SOIL		24.65 TN
07-30-03	088787-00	#L79Y35169	ON	C. SOIL		24.69 TN
07-30-03	088795-00	#L79Y35169	ON	C SOIL		24.32 TN
07-30-03	088800-00	#L79Y35169	ON	C. SOIL		22.89 TN
07-30-03	088803-00	#L79Y35169	ON	C. SOIL		24.87 TN
07-30-03	088805-00	#L79Y35169	ON	C. SOIL		23.20 TN
07-30-03	088833-00	#L79Y35169	ON	C. SOIL		24.37 TN
07-30-03	088842-00	#L79Y35169	ON	C. SOIL		25.45 TN
07-30-03	088853-00	#L79Y35169	ON	C. SOIL		22.95 TN
07-30-03	088855-00	#L79Y35169	ON	C. SOIL		24.27 TN
07-31-03	088904-00	#L79Y35169	ON	C. SOIL		24.60 TN
07-31-03	088905-00	#L79Y35169	ON	C. SOIL		24.58 TN
07-31-03	088920-00	#L79Y35169	ON	C. SOIL		23.03 TN
07-31-03	088921-00	#L79Y35169	ON	C. SOIL		24.14 TN
07-31-03	088945-00	#L79Y35169	ON	C SOIL		22.81 TN
08-04-03	089329-00	#L79Y35169	ON	C SOIL		23.66 TN
08-04-03	089409-00	#L79Y35169	ON	C. SOIL		22.80 TN
08-05-03	089456-00	#L79Y35169	ON	C. SOIL		26.64 TN
08-05-03	089457-00	#L79Y35169	ON	C. SOIL		25.42 TN
08-05-03	089459-00	#L79Y35169	ON	C SOIL		25.87 TN
08-05-03	089460-00	#L79Y35169	ON	C. SOIL		23.12 TN
08-05-03	089467-00	#L79Y35169	ON	C. SOIL		24.20 TN
08-05-03	089501-00	#L79Y35169	ON	C. SOIL		23.28 TN
08-05-03	089509-00	#L79Y35169	ON	C. SOIL		25.24 TN
08-05-03	089519-00	#L79Y35169	ON	C. SOIL		24.48 TN

CUSTOMER ACTIVITYREPORT
From. Jul 01. 2003 To: Sep 24, 2003
Specified Customer: 3728

Facility All Facilities — DETAILED REPORT

Ticket Date	Ticket Number	Contract	Truck ID	Material	Material Rate	Billing Quantity
08-05-03	089520-00	#L79Y35169	ON	C. SOIL		24.77 TN
08-05-03	089571-00	#L79Y35169	ON	C. SOIL		23.19 TN
08-05-03	089584-00	#L79Y35169	ON	C. SOIL		25.27 TN
08-05-03	089589-00	#L79Y35169	ON	C SOIL		24.94 TN
08-05-03	089595-00	#L79Y35169	ON	C. SOIL		24.04 TN
08-06-03	089623-00	#L79Y35169	ON	C. SOIL		26.31 TN
08-06-03	089625-00	#L79Y35169	ON	C. SOIL		25.29 TN
08-06-03	089626-00	#L79Y35169	ON	C. SOIL		23.66 TN
08-06-03	089631-00	#L79Y35169	ON	C SOIL		23.43 TN
08-06-03	089672-00	#L79Y35169	ON	C. SOIL		23.80 TN
08-06-03	089682-00	#L79Y35169	ON	C SOIL		23.90 TN
08-06-03	089687-00	#L79Y35169	ON	C. SOIL		23.65 TN
08-06-03	089704-00	#L79Y35169	ON	C. SOIL		24.13 TN
08-06-03	089705-00	#L79Y35169	ON	C SOIL		24.71 TN
08-06-03	089734-00	#L79Y35169	ON	C SOIL		22.70 TN
08-06-03	089737-00	#L79Y35169	ON	C SOIL		23.74 TN
08-06-03	089745-00	#L79Y35169	ON	C SOIL		24.99 TN
08-06-03	089757-00	#L79Y35169	ON	C. SOIL		24.88 TN
08-06-03	089760-00	#L79Y35169	ON	C SOIL		24.95 TN
08-07-03	089829-00	#L79Y35169	ON	C. SOIL		23.35 TN
08-07-03	089838-00	#L79Y35169	ON	C. SOIL		24.68 TN
08-07-03	089841-00	#L79Y35169	ON	C SOIL		23.59 TN
08-07-03	089891-00	#L79Y35169	ON	C. SOIL		23.14 TN
08-07-03	089900-00	#L79Y35169	ON	C. SOIL		24.29 TN
08-07-03	089901-00	#L79Y35169	ON	C. SOIL		24.88 TN
08-07-03	089920-00	#L79Y35169	ON	C. SOIL		24.68 TN
08-08-03	089970-00	#L79Y35169	ON	C. SOIL		26.21 TN
08-08-03	089973-00	#L79Y35169	ON	C. SOIL		24.96 TN
08-08-03	089984-00	#L79Y35169	ON	C. SOIL		24.91 TN
08-08-03	090013-00	#L79Y35169	ON	C. SOIL		21.62 TN
08-08-03	090024-00	#L79Y35169	ON	C. SOIL		23.75 TN
08-08-03	090025-00	#L79Y35169	ON	C. SOIL		24.62 TN
08-08-03	090070-00	#L79Y35169	ON	C. SOIL		24.81 TN
08-08-03	090110-00	#L79Y35169	ON	C. SOIL		24.39 TN
08-08-03	090111-00	#L79Y35169	ON	C. SOIL		24.95 TN
08-11-03	090255-00	#L79Y35169	ON	C. SOIL		25.10 TN
08-11-03	090256-00	#L79Y35169	ON	C SOIL		24.48 TN
08-11-03	090262-00	#L79Y35169	ON	C. SOIL		23.35 TN
08-11-03	090294-00	#L79Y35169	ON	C SOIL		23.79 TN
08-11-03	090306-00	#L79Y35169	ON	C. SOIL		25.16 TN
08-11-03	090320-00	#L79Y35169	ON	C. SOIL		24.36 TN
08-11-03	090349-00	#L79Y35169	ON	C. SOIL		24.44 TN
08-11-03	090377-00	#L79Y35169	ON	C. SOIL		25.11 TN
08-12-03	090398-00	#L79Y35169	ON	C. SOIL		24.78 TN
08-12-03	090401-00	#L79Y35169	ON	C. SOIL		24.56 TN
08-12-03	090430-00	#L79Y35169	ON	C. SOIL		24.15 TN
08-12-03	090462-00	#L79Y35169	ON	C. SOIL		24.31 TN
08-12-03	090469-00	#L79Y35169	ON	C. SOIL		23.95 TN
08-12-03	090486-00	#L79Y35169	ON	C. SOIL		24.13 TN
08-12-03	090506-00	#L79Y35169	ON	C. SOIL		23.85 TN
08-12-03	090521-00	#L79Y35169	ON	C. SOIL		23.96 TN
08-13-03	090562-00	#L79Y35169	ON	C. SOIL		24.51 TN
08-13-03	090567-00	#L79Y35169	ON	C. SOIL		24.42 TN
08-13-03	090569-00	#L79Y35169	ON	C. SOIL		24.61 TN
08-28-03	092321-00	#L79Y35169	ON	C. SOIL		24.36 TN
08-28-03	092329-00	#L79Y35169	ON	C. SOIL		22.48 TN
08-28-03	092330-00	#L79Y35169	ON	C. SOIL		23.85 TN
08-28-03	092340-00	#L79Y35169	TRK1	C. SOIL		23.40 TN
08-28-03	092385-00	#L79Y35169	ON	C. SOIL		24.81 TN

Facility: All Facilities

DETAILED REPORT

Ticket Date	Ticket Number	Contract	Truck ID	Material	Material Rate	Billing Quantity
08-28-03	092393-00	#L79Y35169	ON	C. SOIL		22.95 TN
08-28-03	092396-00	#L79Y35169	ON	C. SOIL		23.99 TN
08-28-03	092408-00	#L79Y35169	ON	C. SOIL		23.53 TN
08-28-03	092450-00	#L79Y35169	ON	C. SOIL		25.00 TN
08-28-03	092459-00	#L79Y35169	ON	C. SOIL		21.77 TN
08-29-03	092503-00	#L79Y35169	ON	C. SOIL		24.48 TN
08-29-03	092506-00	#L79Y35169	ON	C. SOIL		22.61 TN
08-29-03	092508-00	#L79Y35169	ON	C. SOIL		23.89 TN
08-29-03	092553-00	#L79Y35169	ON	C. SOIL		23.85 TN
08-29-03	092564-00	#L79Y35169	ON	C. SOIL		22.90 TN
08-29-03	092565-00	#L79Y35169	ON	C. SOIL		23.78 TN
09-02-03	092805-00	#L79Y35169	ON	C. SOIL		23.86 TN
09-02-03	092854-00	#L79Y35169	ON	C. SOIL		24.95 TN
09-03-03	092891-00	#L79Y35169	ON	C. SOIL		24.72 TN
09-03-03	092893-00	#L79Y35169	ON	C. SOIL		25.40 TN
09-03-03	092905-00	#L79Y35169	ON	C. SOIL		0.00 TN
09-03-03	092908-00	#L79Y35169	ON	C. SOIL		24.90 TN
09-03-03	092919-00	#L79Y35169	ON	C. SOIL		0.00 TN
09-03-03	092948-00	#L79Y35169	ON	C. SOIL		25.30 TN
09-03-03	092951-00	#L79Y35169	ON	C. SOIL		23.45 TN
09-03-03	092963-00	#L79Y35169	ON	C. SOIL		23.84 TN
09-03-03	093001-00	#L79Y35169	ON	C. SOIL		24.70 TN
09-03-03	093004-00	#L79Y35169	ON	C. SOIL		24.48 TN
09-03-03	093006-00	#L79Y35169	ON	C. SOIL		25.18 TN
09-04-03	093050-00	#L79Y35169	ON	C. SOIL		23.46 TN
09-04-03	093051-00	#L79Y35169	ON	C. SOIL		24.88 TN
09-04-03	093052-00	#L79Y35169	ON	C. SOIL		25.04 TN
09-04-03	093063-00	#L79Y35169	ON	C. SOIL		25.50 TN
09-04-03	093084-00	#L79Y35169	ON	C. SOIL		24.45 TN
09-04-03	093093-00	#L79Y35169	ON	C. SOIL		25.42 TN
09-04-03	093095-00	#L79Y35169	ON	C. SOIL		25.03 TN
09-04-03	093099-00	#L79Y35169	ON	C. SOIL		23.91 TN
09-04-03	093100-00	#L79Y35169	ON	C. SOIL		24.81 TN
09-04-03	093139-00	#L79Y35169	ON	C. SOIL		25.12 TN
09-04-03	093157-00	#L79Y35169	ON	C. SOIL		24.55 TN
09-04-03	093162-00	#L79Y35169	ON	C. SOIL		24.63 TN
09-04-03	093171-00	#L79Y35169	ON	C. SOIL		25.11 TN
09-04-03	093173-00	#L79Y35169	ON	C. SOIL		23.94 TN
09-05-03	093211-00	#L79Y35169	ON	C. SOIL		24.79 TN
09-05-03	093214-00	#L79Y35169	ON	C. SOIL		24.37 TN
09-05-03	093215-00	#L79Y35169	ON	C. SOIL		25.02 TN
09-05-03	093237-00	#L79Y35169	ON	C. SOIL		23.78 TN
09-05-03	093264-00	#L79Y35169	ON	C. SOIL		24.39 TN
09-05-03	093265-00	#L79Y35169	ON	C. SOIL		24.69 TN
09-05-03	093276-00	#L79Y35169	ON	C. SOIL		24.84 TN
09-05-03	093293-00	#L79Y35169	ON	C. SOIL		24.18 TN
09-05-03	093325-00	#L79Y35169	ON	C. SOIL		24.68 TN
09-05-03	093333-00	#L79Y35169	ON	C. SOIL		24.51 TN
09-05-03	093348-00	#L79Y35169	ON	C. SOIL		0.00 TN
09-05-03	093353-00	#L79Y35169	ON	C. SOIL		25.22 TN
09-06-03	093378-00	#L79Y35169	ON	C. SOIL		24.52 TN
09-06-03	093398-00	#L79Y35169	ON	C. SOIL		21.76 TN
09-06-03	093402-00	#L79Y35169	ON	C. SOIL		24.62 TN
09-08-03	093484-00	#L79Y35169	ON	C. SOIL		23.84 TN
09-08-03	093491-00	#L79Y35169	ON	C. SOIL		24.72 TN
09-08-03	093529-00	#L79Y35169	ON	C. SOIL		24.64 TN
09-08-03	093556-00	#L79Y35169	ON	C. SOIL		24.20 TN
09-08-03	093564-00	#L79Y35169	ON	C. SOIL		24.72 TN
09-08-03	093602-00	#L79Y35169	ON	C. SOIL		24.39 TN

CUSTOMER ACTIVITY REPORT
From: Jul 01, 2003 To: Sep 24, 2003
Specified Customer: 3728

Facility: All Facilities — DETAILED REPORT

Ticket Date		Ticket Number	Contract	Truck ID	Material	Material Rate	Billing Quantity
09-09-03	I	093618-00	#L79Y35169	ON	C. SOIL		25.44 TN
09-09-03	I	093620-00	#L79Y35169	ON	C. SOIL		24.82 TN
09-09-03	I	093624-00	#L79Y35169	ON	C. SOIL		25.31 TN
09-09-03	I	093673-00	#L79Y35169	ON	C. SOIL		24.08 TN
09-09-03	I	093690-00	#L79Y35169	ON	C. SOIL		24.23 TN
09-09-03	I	093691-00	#L79Y35169	ON	C. SOIL		24.50 TN
09-09-03	I	093714-00	#L79Y35169	ON	C. SOIL		24.85 TN
09-09-03	I	093751-00	#L79Y35169	ON	C. SOIL		24.26 TN
09-09-03	I	093762-00	#L79Y35169	ON	C. SOIL		25.18 TN
09-09-03	I	093765-00	#L79Y35169	ON	C. SOIL		24.34 TN
09-09-03	I	093771-00	#L79Y35169	ON	C SOIL		24.49 TN
09-10-03	I	093813-00	#L79Y35169	ON	C. SOIL		24.93 TN
09-10-03	I	093814-00	#L79Y35169	ON	C. SOIL		25.36 TN
09-10-03	I	093819-00	#L79Y35169	ON	C. SOIL		24.54 TN
09-10-03	I	093874-00	#L79Y35169	ON	C. SOIL		23.97 TN
09-10-03	I	093929-00	#L79Y35169	ON	C. SOIL		23.68 TN

Tickets Reported: 309 — CUSTOMER TOTALS:

Material Summary	Inbound Weight	Inbound Volume	Outbound Weight	Outbound Volume	Billing Quantity
S3 - C. SOIL	7,303.71 TN	37,750.00 YD	0.00 TN	0.00 YD	7,303.71 TN

- 2990.39 (PAY APP #1)

= 4313.22 ✓

Total Tickets: 309

Appendix B

Photographs

Photo 1 - Sediment Trap Installation June 2003

Photo 2 - Basin Bypass July 2003.

Photo 3 - Segment VII July 2003

Photo 4 - Segment BIX Railroad Ties In Creek

Photo 5 - Segment CVII Creek Channell – Excavation of Saturated Material

Photo 6 - Segment CV Restoration.

Photo 7 - Segment DI.

Photo 8 - Segment DIII – Residual Contamination (dark areas)

Photo 9 - Segment DIII, looking east

Photo 10 - Segment EI, looking west

Photo 11 - Segment EII

Photo 12 - Segment FVI, looking west

Photo 13 - Segment FVII Culvert

Photo 14 - Segment FVII Culvert

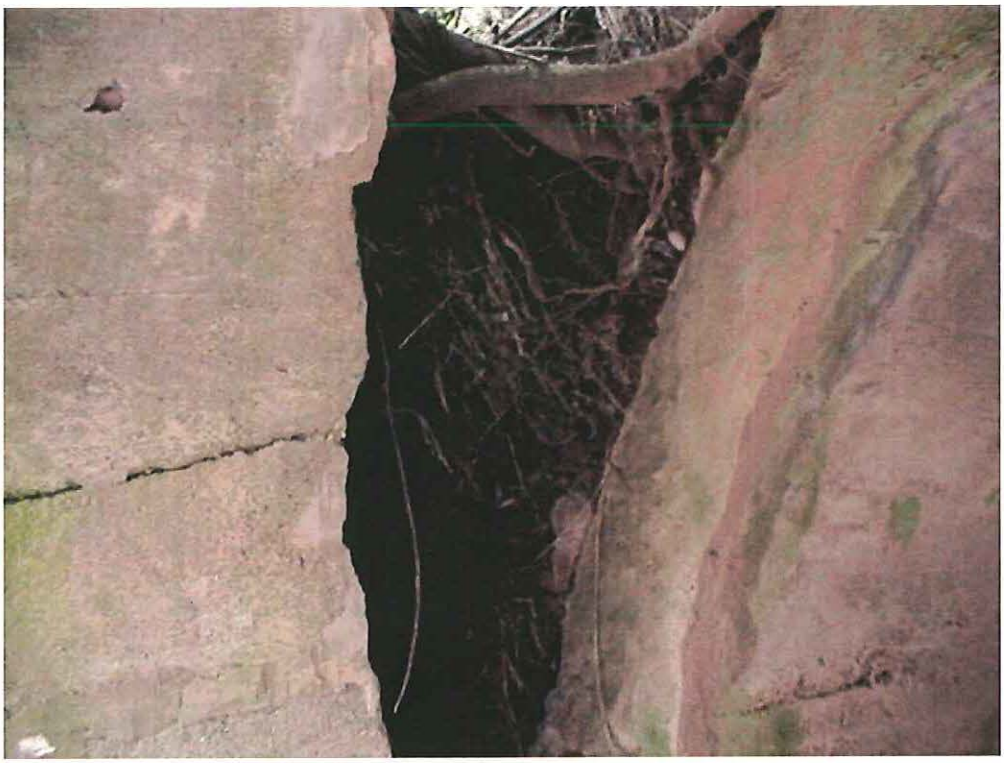


Photo 15 - Segment FVII Culvert

Photo 16 - Segment FIII Saplings

Photo 17 - Segment FII, looking east

Photo 18 - Segment GII

Photo 19 - Segment GIV, looking east

Photo 20 - Segment GIII, looking east

Photo 21 - Segment HIII, looking west

Photo 22 - Segment I III, looking east

Photo 23 - Segment J, looking west

Photo 24 - Segment J, looking west

Photo 25 - Segment KIV, looking east

Photo 26 - Segment KIV, looking east

Appendix C

Construction Quantities Lists

9/17/03

ERROSION CONTROL QUANTITY LIST

Errosion Control Matting

Description	Length	Width	Square Feet	Square Yards		NA
Seg. BV west	50	4	200	22.2	22.2	
north side	2240	4	8960	995.6	995.6	
south side	2240	4	8960	995.6	995.6	
access road	**50**	**8**	400	**44.4**		**44.4**
	120	32	3840	426.7	426.7	
Seg. C slope north	125	24	3000	333.3	333.3	
access road	**100**	**16**	**1600**	**177.8**		**177.8**
north side	70	20	1400	155.6	155.6	
	50	8	400	44.4	44.4	
	175	4	700	77.8	77.8	
	60	8	480	53.3	53.3	
south side	50	4	200	22.2	22.2	
	50	24	1200	133.3	133.3	
	290	8	2320	257.8	257.8	
Seg. D north side	30	4	120	13.3	13.3	
	125	12	1500	166.7	166.7	
	185	8	1480	164.4	164.4	
	70	16	1120	124.4	124.4	
	100	4	400	44.4	44.4	
	140	8	1120	124.4	124.4	
	335	4	1340	148.9	148.9	
	75	12	900	100.0	100.0	
south side	1045	4	4180	464.4	464.4	
Additional work	63	4	252	28.0	28.0	
Additional work	70	16	1120	124.4	124.4	
Additional work	60	8	480	53.3	53.3	
Additional work	200	16	3200	355.6	355.6	
Additional work	70	4	280	31.1	31.1	
Seg. E north side	130	4	520	57.8	57.8	
south side	130	20	2600	288.9	288.9	
Seg. F north side	260	16	4160	462.2	462.2	
	165	4	660	73.3	73.3	
south side	240	4	960	106.7	106.7	
	105	16	1680	186.7	186.7	
	105	4	420	46.7	46.7	
	50	16	800	88.9	88.9	
	205	16	3280	364.4	364.4	
	205	4	820	91.1	91.1	
Seg. G north side	330	12	3960	440.0	440.0	
	130	4	520	57.8	57.8	
	460	8	3680	408.9	408.9	
south side	460	4	1840	204.4	204.4	
south side seg. H	115	12	1380	153.3	153.3	
south	115	8	920	102.2	102.2	
north side	110	4	440	48.9	48.9	
south side seg. I	240	4	960	106.7	106.7	
south	240	16	3840	426.7	426.7	
north side	240	4	960	106.7	106.7	
Seg. J north side	210	4	840	93.3	93.3	
	100	16	1600	177.8	177.8	
south side	210	4	840	93.3	93.3	
Seg. K north side	250	16	4000	444.4	444.4	
	150	16	2400	266.7	266.7	
south side	250	4	1000	111.1	111.1	
	150	4	600	66.7	66.7	
Total thru segment K					**10536.9**	

Coir Logs

Segment I.D.	Quantity Installed
B & C	87
D	43
E	26
F	50
G	31
H	11
I	19
J	9
K	16
Total	**292**

PAY APP#1 **SEH Check on Quantities vs. Tickets.**

breaker run			streambed stone			rip rap		
ticket #	lbs	tons	ticket #	lbs	tons	ticket #	lbs	tons
6230723	42760		31823	29680		6230742	38400	
6230817	44420		31828	41740		6230833	45060	
6230913	44900		31833	34480		6230924	46320	
6230927	44420		31839	35740		6231017	40180	
6231001	43480		31844	34620		6231106	41440	
6231054	45840		31865	36040		6231202	44520	
6231156	45220		31912	35180		6231258	46840	
6231251	45960		31918	39560		6231349	44900	
6231344	46040		31921	44960		6231442	46620	
6231431	44980		31922	33460		6231529	48060	
6231524	45120		31925	40560		6231616	48580	
6231610	48000		31941	42760				
6240718	49100		31945	35040				
6240819	44000		31949	41440				
6240912	45740		31952	44140				
7090924	43700		31954	33460				
7091012	41900		31957	42480				
7091058	40420		total	645340	322.67		490920	245.46
7091153	47300							
7091242	44120							
7091331	42240							
7091335	43840							
7091432	43000							
7091545	41720							
7091641	38800							
7160714	42860							
7160744	42680							
7160811	43920							
7160840	47720							
7160908	44100							
7160935	43040							
7161004	43440							
7161041	43640							
7161112	44960							
7161153	47320							
7161252	48420							
7161327	44660							
7161405	43640							
7161436	45560							
7161513	45660							
7161550	47340							
7161632	44660							
7161745	44100							
7161818	48260							
7161849	45660							
7220850	39740							
7220944	45840							
7221036	42760							
7221125	46020							
7221221	45220							
7221312	45340							
7221404	45600							
7221459	43540							
7221601	45440							
7230727	44080							
7230819	43540							
7230909	43480							
7230958	45440							
7231049	43680							
7231143	42740							
7231229	44180							
7231319	43260							
7231410	43260							
7231523	42940							
7231614	44220							
total	2888980	1444.49						

Appendix D

Laboratory Analytical Reports

EN CHEM
A Division of Pace Analytical Services, Inc.
1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 851143

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT A

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-001

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	49	0.25	0.83		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	24	0.14	0.46		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	99	9.0	30		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	890				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	54.7				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	9400	300	1000		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	40			7.2	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	9.4	8.4	28		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 12	12	39		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Acenaphthene	< 5.8	5.8	19		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Acenaphthylene	< 20	20	68		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Anthracene	13	7.8	26		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 45	45	150		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 37	37	120		1	ug/Kg	*	09/28/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	< 30	30	100		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	< 20	20	68		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 40	40	130		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Chrysene	< 42	42	140		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 12	12	40		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Fluoranthene	< 35	35	120		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Fluorene	7.3	4.9	16		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 19	19	64		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Naphthalene	< 9.0	9.0	30		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Phenanthrene	< 21	21	69		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Pyrene	< 45	45	150		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	24				1	%Recov		09/28/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	55				1	%Recov		09/28/04	SW846 3545	8270C-SIM
Terphenyl-d14	69				1	%Recov		09/28/04	SW846 3545	8270C-SIM

EN CHEM
A Division of Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 851143

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT B

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-002

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	45	0.31	1.0		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	60	0.17	0.57		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	130	9.2	31		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	2000				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	44.0				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	71000	2800	9200		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	260			8.5	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	27	10	35		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	26	15	49		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Acenaphthene	< 7.2	7.2	24		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Acenaphthylene	< 25	25	84		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Anthracene	45	9.8	33		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 57	57	190		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 46	46	150		1	ug/Kg	*	10/03/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	39	37	120		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	43	25	84		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 50	50	170		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Chrysene	55	52	170		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 15	15	50		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Fluoranthene	64	43	140		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Fluorene	< 6.0	6.0	20		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 24	24	80		1	ug/Kg		10/03/04	SW846 3545	8270C-SIM
Naphthalene	15	11	37		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Phenanthrene	40	26	85		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Pyrene	64	57	190		1	ug/Kg	Q	10/03/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	37				1	%Recov		10/03/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	51				1	%Recov		10/03/04	SW846 3545	8270C-SIM
Terphenyl-d14	63				1	%Recov		10/03/04	SW846 3545	8270C-SIM

EN CHEM
A Division of Pace Analytical Services, Inc.
1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 851143

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT D

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-003

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	32	0.43	1.4		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	43	0.24	0.80		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	240	10	34		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	1300				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	31.6				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	46000	1100	3600		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	36			12	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	51	15	48		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	27	21	68		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Acenaphthene	< 10	10	33		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Acenaphthylene	< 35	35	120		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Anthracene	15	14	45		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 79	79	260		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 64	64	210		1	ug/Kg	*	10/02/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	< 52	52	170		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	< 35	35	120		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 70	70	230		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Chrysene	< 73	73	240		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 21	21	70		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Fluoranthene	< 60	60	200		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Fluorene	9.0	8.4	28		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 34	34	110		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Naphthalene	< 16	16	52		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Phenanthrene	< 36	36	120		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Pyrene	< 79	79	260		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	49				1	%Recov		10/02/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	51				1	%Recov		10/02/04	SW846 3545	8270C-SIM
Terphenyl-d14	57				1	%Recov		10/02/04	SW846 3545	8270C-SIM

EN CHEM
A Division of Pace Analytical Services, Inc.
1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 851143

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT G

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-004

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	37	0.34	1.1		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	45	0.19	0.63		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	170	12	39		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	1700				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	40.3				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	32000	1300	4300		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	19			9.2	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	13	11	38		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 16	16	54		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Acenaphthene	< 7.9	7.9	26		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Acenaphthylene	< 28	28	92		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Anthracene	15	11	36		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 62	62	210		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	50	50	170		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	56	41	140		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	33	28	92		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 55	55	180		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Chrysene	< 57	57	190		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 16	16	55		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Fluoranthene	92	47	160		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Fluorene	7.4	6.6	22		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	29	26	87		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Naphthalene	< 12	12	41		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Phenanthrene	43	28	93		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Pyrene	77	62	210		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	51				1	%Recov		09/28/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	64				1	%Recov		09/28/04	SW846 3545	8270C-SIM
Terphenyl-d14	69				1	%Recov		09/28/04	SW846 3545	8270C-SIM

EN CHEM
A Division of Pace Analytical Services, Inc.
1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 851143

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT K

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-005

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	32	0.31	1.0		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	70	0.17	0.58		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	110	6.3	21		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	760				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	43.8				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	26000	660	2200		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	< 7.7			7.7	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	20	10	35		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	20	15	49		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Acenaphthene	< 7.2	7.2	24		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Acenaphthylene	< 26	26	85		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Anthracene	19	9.8	33		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 57	57	190		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	60	46	150		1	ug/Kg	Q*	10/02/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	63	38	130		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	26	25	85		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	66	50	170		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Chrysene	64	52	170		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 15	15	51		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Fluoranthene	120	43	140		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Fluorene	< 6.1	6.1	20		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	24	24	81		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Naphthalene	19	11	37		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Phenanthrene	66	26	86		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Pyrene	110	57	190		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	27				1	%Recov		10/02/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	37				1	%Recov		10/02/04	SW846 3545	8270C-SIM
Terphenyl-d14	51				1	%Recov		10/02/04	SW846 3545	8270C-SIM

EN CHEM
A Division of Pace Analytical Services, Inc.
1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 851143

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT K DUPLICATE

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-006

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	34	0.27	0.91		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	29	0.15	0.50		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	84	9.4	31		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	590				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	50.2				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	22000	580	1900		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	12			8.1	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	22	9.1	30		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 13	13	43		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Acenaphthene	< 6.3	6.3	21		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Acenaphthylene	< 22	22	74		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Anthracene	16	8.6	29		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	55	50	170		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	62	40	130		1	ug/Kg	Q*	10/02/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	68	33	110		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	28	22	74		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	71	44	150		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Chrysene	71	46	150		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 13	13	44		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Fluoranthene	130	38	130		1	ug/Kg		10/02/04	SW846 3545	8270C-SIM
Fluorene	6.3	5.3	18		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	27	21	70		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Naphthalene	11	9.8	33		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Phenanthrene	72	22	75		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Pyrene	120	50	170		1	ug/Kg	Q	10/02/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	34				1	%Recov		10/02/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	46				1	%Recov		10/02/04	SW846 3545	8270C-SIM
Terphenyl-d14	54				1	%Recov		10/02/04	SW846 3545	8270C-SIM

EN CHEM
A Division of Pace Analytical Services, Inc.

Analytical Report Number: 851143

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Client : SEH
Project Name : NEWTON CREEK
Project Number : WIDNR9905.01
Field ID : SEGMENT L

Matrix Type : SEDIMENT
Collection Date : 09/17/04
Report Date : 10/12/04
Lab Sample Number : 851143-007

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Chromium	29	0.26	0.86		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Lead	30	0.14	0.48		5	mg/Kg		09/28/04	SW846 3050B	SW846 6020
Grain Size	Attache				1					
Nitrogen, Ammonia	92	5.2	17		1	mg/kg		10/08/04	EPA M350.1	EPA M350.1
Oil & Grease, Total Recoverable	560				1	mg/kg		09/28/04	EPA 1664	EPA 1664
Percent Solids	52.9				1	%		09/22/04	SM 2540G M	SM 2540G M
TOC as NPOC	37000	1200	3900		1	mg/kg		10/04/04	SW846 M9060	SW846 M9060

DIESEL RANGE ORGANICS

Preservation Date: 09/22/04 **Prep Date:** 09/22/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Diesel Range Organics	310			14	2	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank	< 5.0			5.0	1	mg/kg		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike	76				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO
DRO Blank Spike Duplicate	77				1	%Recov		09/23/04	WI MOD DRO	WI MOD DRO

PAH/PNA

Prep Date: 09/23/04

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	16	8.7	29		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 12	12	41		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Acenaphthene	< 6.0	6.0	20		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Acenaphthylene	< 21	21	70		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Anthracene	21	8.1	27		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 47	47	160		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Benzo(a)pyrene	49	38	130		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	53	31	100		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(ghi)perylene	23	21	70		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 42	42	140		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Chrysene	83	43	140		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 13	13	42		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Fluoranthene	75	36	120		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Fluorene	15	5.0	17		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 20	20	67		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Naphthalene	< 9.3	9.3	31		1	ug/Kg		09/28/04	SW846 3545	8270C-SIM
Phenanthrene	49	21	71		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Pyrene	110	47	160		1	ug/Kg	Q	09/28/04	SW846 3545	8270C-SIM
Nitrobenzene-d5	55				1	%Recov		09/28/04	SW846 3545	8270C-SIM
2-Fluorobiphenyl	65				1	%Recov		09/28/04	SW846 3545	8270C-SIM
Terphenyl-d14	61				1	%Recov		09/28/04	SW846 3545	8270C-SIM

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 873124S

Client : SEH, INC.
Project Name : NEWTON CREEK / HI INLET
Project Number WIDNR9905.06
Field ID : NC-L SEDIMENT

Matrix Type : SEDIMENT
Collection Date : 06/15/06
Report Date : 07/28/06
Lab Sample Number 873124-006

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	14	0.50	1.7		1	mg/Kg		06/27/06	SW846 3050B	SW846 6010B
Percent Solids	67.5				1	%		06/21/06	SM M2540G	SM M2540G
TOC as NPOC	20000	1200	4000		1	mg/kg		06/27/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date 06/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	5.0	4.5	15		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	7.6	4.6	15		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 4.4	4.4	15		1	ug/Kg		06/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 4.3	4.3	14		1	ug/Kg		06/21/06	SW846 3545	8270C-SIM
Anthracene	5.7	5.3	18		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	7.9	7.9	26		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	8.2	4.3	14		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	7.8	4.2	14		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	6.4	5.3	18		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	7.9	4.5	15		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Chrysene	12	6.5	22		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 4.1	4.1	14		1	ug/Kg		06/21/06	SW846 3545	8270C-SIM
Fluoranthene	14	4.3	14		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Fluorene	< 5.1	5.1	17		1	ug/Kg		06/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	5.2	3.7	12		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Naphthalene	< 5.9	5.9	20		1	ug/Kg		06/21/06	SW846 3545	8270C-SIM
Phenanthrene	13	4.4	15		1	ug/Kg	Q	06/21/06	SW846 3545	8270C-SIM
Pyrene	29	3.6	12		1	ug/Kg		06/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	49	10	141		1	%		06/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	63	10	161		1	%		06/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	56	29	150		1	%		06/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-SEGMENT L

Matrix Type : SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-007

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	29	0.88	2.9		1	mg/Kg		08/23/06	SW846 3050B	SW846 6010B
Percent Solids	38.4				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	31000	2800	9500		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date: 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	< 16	16	52		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 16	16	54		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 15	15	52		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 15	15	50		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	< 19	19	62		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 28	28	92		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 15	15	50		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	< 15	15	49		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	< 19	19	62		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 16	16	53		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Chrysene	< 23	23	76		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 14	14	48		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	23	15	50		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Fluorene	< 18	18	59		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 13	13	44		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 21	21	70		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	< 15	15	51		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Pyrene	22	13	43		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	32	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	31	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	33	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-69 SEG A

Matrix Type : SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-001

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	43	0.59	2.0		1	mg/Kg	N	08/23/06	SW846 3050B	SW846 6010B
Percent Solids	57.3				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	51000	2500	8500		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date: 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	11	11	35		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	11	11	36		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 10	10	35		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 10	10	33		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	24	12	41		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 18	18	62		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	18	10	33		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	17	9.8	33		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	21	12	41		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	14	11	36		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Chrysene	20	15	51		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 9.6	9.6	32		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	21	10	33		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Fluorene	< 12	12	40		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	11	8.8	29		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 14	14	47		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	14	10	34		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Pyrene	26	8.6	29		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	74	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	64	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	78	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-69 DUPLICATE

Matrix Type : SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-002

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	39	0.68	2.3		1	mg/Kg		08/23/06	SW846 3050B	SW846 6010B
Percent Solids	49.7				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	30000	2300	7600		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	< 12	12	41		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 13	13	42		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 12	12	40		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 12	12	39		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	22	14	48		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 21	21	71		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	20	12	38		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	17	11	38		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	30	14	48		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	16	12	41		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Chrysene	21	18	58		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 11	11	37		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	32	12	39		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Fluorene	< 14	14	46		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	14	10	34		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 16	16	54		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	21	12	39		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Pyrene	31	9.9	33		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	77	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	66	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	77	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-085 SEG B

Matrix Type : SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-003

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	17	1.0	3.4		1	mg/Kg		08/23/06	SW846 3050B	SW846 6010B
Percent Solids	32.8				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	43000	3400	11000		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date: 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	< 18	18	62		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 19	19	64		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 18	18	60		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 18	18	59		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	< 22	22	72		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 32	32	110		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 18	18	58		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	< 17	17	57		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	< 22	22	72		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 19	19	62		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Chrysene	< 27	27	89		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 17	17	56		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	< 18	18	59		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluorene	< 21	21	69		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 15	15	51		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 24	24	82		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	< 18	18	60		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Pyrene	< 15	15	50		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	79	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	70	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	78	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-084 SEG D

Matrix Type SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-004

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	23	1.5	4.9		1	mg/Kg		08/23/06	SW846 3050B	SW846 6010B
Percent Solids	23.0				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	47000	1800	5900		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	< 26	26	88		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 27	27	91		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 26	26	86		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 25	25	83		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	< 31	31	100		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 46	46	150		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 25	25	83		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	< 24	24	81		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	< 31	31	100		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 27	27	89		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Chrysene	< 38	38	130		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 24	24	80		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	< 25	25	83		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluorene	< 30	30	99		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 22	22	73		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 35	35	120		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	< 26	26	85		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Pyrene	< 21	21	71		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	59	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	51	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	55	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-SEGMENT F

Matrix Type : SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-005

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	33	1.3	4.5		1	mg/Kg		08/23/06	SW846 3050B	SW846 6010B
Percent Solids	25.2				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	77000	2800	9500		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	< 24	24	80		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 25	25	83		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 24	24	79		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 23	23	76		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	< 28	28	94		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 42	42	140		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	30	23	76		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	29	22	74		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	28	28	94		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 24	24	81		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Chrysene	58	35	120		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 22	22	73		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	30	23	76		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Fluorene	< 27	27	90		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 20	20	67		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 32	32	110		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	< 23	23	78		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Pyrene	40	19	65		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	86	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	74	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	81	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Pace Analytical Services, Inc.

1241 Bellevue Street
Green Bay, WI 54302
920-469-2436

Analytical Report Number: 875218

Client : SEH, INC.
Project Name : NEWTON CREEK
Project Number WIDNR9905.06
Field ID : NC-SEGMENT G

Matrix Type : SOIL
Collection Date : 08/16/06
Report Date : 09/12/06
Lab Sample Number 875218-006

INORGANICS

Test	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
Lead	37	1.2	4.1		1	mg/Kg		08/23/06	SW846 3050B	SW846 6010B
Percent Solids	27.2				1	%		08/21/06	SM M2540G	SM M2540G
TOC as NPOC	58000	2800	9500		1	mg/kg		08/31/06	SW846 M9060	SW846 M9060

PAH/PNA

Prep Date: 08/21/06

Analyte	Result	LOD	LOQ	EQL	Dil.	Units	Code	Anl Date	Prep Method	Anl Method
1-Methylnaphthalene	< 22	22	74		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
2-Methylnaphthalene	< 23	23	77		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthene	< 22	22	73		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Acenaphthylene	< 21	21	71		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Anthracene	< 26	26	87		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)anthracene	< 39	39	130		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(a)pyrene	< 21	21	70		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(b)fluoranthene	< 21	21	69		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(ghi)perylene	< 26	26	87		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Benzo(k)fluoranthene	< 22	22	75		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Chrysene	< 32	32	110		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Dibenz(a,h)anthracene	< 20	20	68		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluoranthene	< 21	21	71		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Fluorene	< 25	25	84		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Indeno(1,2,3-cd)pyrene	< 19	19	62		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Naphthalene	< 30	30	98		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Phenanthrene	< 22	22	72		1	ug/Kg		08/21/06	SW846 3545	8270C-SIM
Pyrene	23	18	60		1	ug/Kg	Q	08/21/06	SW846 3545	8270C-SIM
Surrogate		**LCL**	**UCL**							
Nitrobenzene-d5	74	10	141		1	%		08/21/06	SW846 3545	8270C-SIM
2-Fluorobiphenyl	66	10	161		1	%		08/21/06	SW846 3545	8270C-SIM
Terphenyl-d14	76	29	150		1	%		08/21/06	SW846 3545	8270C-SIM

All soil results are reported on a dry weight basis unless otherwise noted.

Appendix E

Macroinvertebrate Population Studies

ANALYSIS OF MACROINVERTEBRATE SAMPLES COLLECTED FROM NEWTON CREEK, SUPERIOR, WI: OCTOBER 30-31, 2003

Report submitted to:

Mr. Mark Broses
SEH, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

Submitted by:

Kurt L. Schmude, Ph.D.
Associate Scientist
Lake Superior Research Institute (LSRI)
University of Wisconsin-Superior (UW-Superior)
801 N. 28th Street
Superior, WI

February 27, 2004

INTRODUCTION

This report is similar in format to Schmude (2001, 2002a). It provides information and data on the benthic macroinvertebrate samples that were collected on October 30-31, 2003 from six sections of Newton Creek. These sites include the following:

1. NC-A
2. NC-B
3. NC-D
4. NC-F
5. NC-G
6. NC-L

This report provides the first information on the benthic macroinvertebrate community following the reclamation project that was completed on Newton Creek earlier during 2003 (project completed by SEH, Inc.). Most of the stream was reclaimed, and sections NC-B through NC-G were included within the reclaimed portions. Site NC-A was previously reclaimed and was not included in the current reclamation project. Site NC-L near the mouth of Newton Creek was also not included.

METHODS

COLLECTION OF SAMPLES

Samples were collected on October 30 and 31, 2003. Site locations were the same as the locations for previous studies. GPS coordinates were obtained for each site. The collection of the samples from sites NC-A and NC-L followed the same procedures performed during previous sampling events (Schmude 2001, 2002a,b, 2003). Kurt Schmude used the core sampler to collect the benthic samples at both sites.

A different sampling technique was used to collect the benthic samples from sites NC-B, NC-D, NC-F, and NC-G, compared to previous studies. As part of the reclamation project, the streambed at these sites was dredged and rock was used to replace the soft sediments. Consequently, a coring device was no longer suitable to collect benthos from this type of substrate. Instead, a Hess sampler (Wildlife Supply Company) was used. This sampler had an inner diameter of 33 cm and an attached Nitex® collecting net/bag with a mesh of 363 μm. The steel cylinder was pressed into the hardened streambed as far as possible (10-15 cm); the large rocks made it difficult to accomplish this task. Once the sampler was securely in place, all rocks that were encompassed by the cylinder were removed to a depth of 10-15 cm and placed in a 5-gallon bucket. These rocks were washed clean with a small brush to remove all attached debris and organisms. This material was collected and placed in a sample jar. Meanwhile, the sediment still remaining within the cylinder of the sampler was disturbed by hand and a large spoon for 2-3 minutes. The dislodged debris and organisms were washed downstream into the collecting bag. This material was transferred into the same sample jar. The contents were preserved with 10% formalin solution with rose bengal stain. Kurt Schmude operated the Hess sampler for all samples.

Five replicate Hess samples were collected at sites NC-B, NC-D, NC-F, and NC-G. A decision

needed to be made concerning the exact location of the replicates. Each of the four sites had been drastically changed by the reclamation project, and the slow-moving, depositional zones that were previously prevalent, were absent. Instead, the stream was comprised of shallow riffle and pool areas, all of which had rock for a substrate. The shallow riffle areas were chosen as the habitat to be sampled; this type of habitat is routinely sampled for biomonitoring studies of streams, and is preferred over pool areas. The five Hess samples were sequentially collected in a downstream to upstream manner following a diagonal pattern across the width and length of the riffle area.

LABORATORY PROCESSING

Core samples were sieved in the field and processed in the lab using a 250-μm mesh sieve. All replicates from Site NC-L and all but one sample from Site NC-A were split into halves following the same procedures established in previous studies; one sample from NC-A (rep. 5) was inadvertently processed as a whole sample. No additional subsampling of the oligochaete worms was necessary, unlike that which occurred for some of the samples collected in July, 2002 (Schmude 2002b).

Although Hess samples were collected in the field using a 363-µm mesh net, minimal sieving was performed in the field. The samples were more thoroughly sieved in the lab using a 250-μm mesh sieve. The number of organisms found in the first two samples that were picked (NC-B, reps. 3 & 5) was quite high, so the remainder of the samples were split into quarters. Additional subsampling of organisms was not necessary.

ANALYSIS

Data from the core samples were multiplied by 2 (except for NC-A, rep.5) to correct for the splitting technique. The coring device captured an area of 0.00453 m^2, and the data was further multiplied by the correction factor of 220.4 to obtain organisms/m^2.

Data from the Hess samples were multiplied by 2 (NC-B, reps. 3 & 5) or 4 (all replicates at sites NC-D, NC-F, NC-G, and 3 reps. for site NC-B) to correct for the splitting technique. The Hess sampler captured an area of 0.08553 m^2, and the data were further multiplied by the correction factor of 11.69 to obtain organisms/m^2.

Data are presented in Table 2 (raw data) and Table 3 (organisms/m^2). A summary of the current data, and the data obtained from all previous and comparable studies on Newton Creek, are presented in Table 1. No statistical tests were performed on the data.

QUALITY CONTROL

Three samples were randomly chosen (from batches of 10 samples) to be examined for splitting accuracy and picking accuracy. The results are as follows:

SPLITTING SAMPLES

Sample	Number of Organisms 1st Half	2nd Half	% Error	Type of sample
NC-A replicate 4	413	366	6.0	core sample
	Quarter	Quarter		
NC-B rep. 5	433 (1st)	255 (4th)	25.9	Hess sample
NC-D rep. 5	421 (1st)	240 (4th)	27.4	Hess sample

There was an average splitting error of 26.6% among the Hess samples. When samples are increasingly subsampled, it becomes more difficult to accurately split the sample into equal portions. This situation can be exacerbated by some types of sediment material, such as stringy periphyton, which was prevalent on most of the rocks in Newton Creek and subsequently in the Hess samples. However, the Hess samples were identically processed (except for the first two samples, which were split only into halves), and each subsample was randomly chosen for analysis. These actions eliminated any bias in the data and allowed for data comparability for the analysis.

PICKING SAMPLES

The first two samples that were picked by one assistant were determined to have too high of a picking-error percentage. Before additional samples were processed by this assistant, the two remaining samples that were picked by this person were repicked by another assistant. The assistant in question received further training before resuming work. No further problems were encountered. Three samples were randomly chosen for Quality Control.

Sample	Number of Organisms 1st Pick	2nd Pick	Total	%Error
NC-D rep.1 (4 of 4)	188	8	196	4.1
NC-G rep.2 (2 of 4)	447	42	489	8.6
NC-L rep.1 (1 of 2)	526	17	543	3.1
Total	1161	67	1228	5.8

RESULTS

The data for the October 30-31, 2003 sampling event are presented in Tables 2 and 3. A summary of the results is presented in Table 1.

Site NC-A

Chironomid midges showed a 4.5 to 10.5-fold increase compared to previous years, while oligochaete worms decreased 62-73% compared to October of 1999, 2001, and 2002. Numbers of oligochaetes were lower in 2000, but this may be due to a slightly earlier sampling date (September, i.e. seasonal differences). Total abundance of macroinvertebrates, however, did not change compared to previous years. A taxa richness value of 9.2 represented the highest value

for this site over the past six sampling events, spanning five years. The difference in the midge community was driven by a substantial increase in the collector-gatherer larvae of *Micropsectra* (60,257 larvae/m^2), which were prevalent at all stations in Newton Creek. In addition, numbers of the predatory Tanypodinae were slightly lower compared to numbers collected in 2000-2002.

Sites NC-B, NC-D, NC-F, and NC-G

The fauna at these three sites were similar to each other and represented a drastic change from the fauna observed in previous years. Densities of chironomid midges were higher at nearly all sites for each of the previous four years (exceptions: Site NC-B, 1999; Site NC-D, 2001; Site NC-F, 2001). Meanwhile, densities of oligochaete worms were dramatically lower at all sites and represented the lowest values for these sites over the last five years. Consequently, chironomid midges were now the dominant group at these sites instead of worms. The abundant midges included *Micropsectra*, and at least two species of *Cricotopus*, which are considered collector-gatherers of algae. Another midge that increased, at least at Sites NC-F and NC-G, was *Paratanytarsus*. Midges that were collected for the first time within this stretch of the stream included *Endochironomus subtendens* group, *Polypedilum aviceps*, *Polypedilum fallax* group, *Corynoneura*, and *Parametriocnemus*.

The snail *Physa* also increased at all four sites. This herbivore was readily observed grazing on the rocks in the riffle and pool areas. In addition, larvae of filter-feeding black flies (Simuliidae) in the *Simulium vittatum* species complex appeared for the first time in Newton Creek, and their numbers were relatively high (224-3760 larvae/m^2). This species group of black flies is very tolerant to perturbations in streams, and would be expected to be the first species of black fly to colonize a disturbed habitat. **Black flies were not present at the two sites that were not reclaimed (Sites NC-A, NC-L).** Another insect group that appeared for the first time was the dance fly (Empididae), which included two genera, *Chelifera* (two sites) and *Hemerodromia* (all four sites). The larvae of these flies are either predators or collector-gatherers, depending on the species.

At site NC-F, the tiny, but predatory worm, *Chaetogaster diastrophus*, appeared for the first time in Newton Creek. This worm can be abundant in the periphyton growing on rocks and other substrates.

Finally, the most remarkable discovery was the collection of three caddisfly larvae, one each of *Cheumatopsyche* (Site NC-F), *Hydropsyche betteni* (Site NC-B), and *Hydroptila* (Site NC-G). The first two caddisflies are filter feeders in the family Hydropsychidae, while *Hydroptila* (Hydroptilidae) is a herbivore on algae. These three taxa are considered relatively tolerant to perturbations in streams and would be expected to be the first caddisflies to colonize a disturbed or reclaimed stream. Even though only three specimens were collected, they represent the first EPT taxa (Ephemeroptera – mayflies, Plecoptera – stoneflies, Trichoptera – caddisflies) found in Newton Creek. In general, higher values of EPT taxa indicate better (or increasing) water quality.

Taxa richness values at all four sites increased sharply, ranging from 14.2 to 17.2, the highest values recorded for the entire stream to date. In the past, taxa richness values ranged from 4.4 (Site NC-B, 1994) to 10.0 (Site NC-B, 1999), but were in the 6-9 range in recent years.

Site NC-L

Densities of chironomid midges (27,859 larvae/m^2) and snails (38,790 individuals/m^2) increased to the highest levels recorded for this site over the last three years, while oligochaete worms (108,613 individuals/m^2) decreased from last year (176,056 individuals/m^2). Numbers of amphipods were similar to last year's values. Overall, total macroinvertebrate abundance was almost identical to last year's total. However, taxa richness (17.2) increased to the highest level recorded for this site.

DISCUSSION

The reclamation project that was completed on Newton Creek in 2003 resulted in immediate changes in the invertebrate fauna. The removal of soft sediments eliminated the huge populations of oligochaete worms from sections NC-B through NC-G. The placement of rock on the streambed in this stretch of the stream provided substrate for the growth of algae, and a resultant habitat that was suitable for invertebrates other than worms to colonize. Populations of several taxa of chironomid midges increased, and organisms such as physid snails, and black fly and dance fly larvae not only appeared for the first time, but in relatively high numbers. Remarkably, three taxa of caddisflies appeared

Slight decreases in populations of snails and black flies in the reclaimed portions of the stream from the upstream site (NC-B) to the downstream site (NC-G) might be due to the time involved in the construction work. The upstream portion was reclaimed first during the season, and construction proceeded downstream; the process took several months. The upstream sections had a longer length of time to be recolonized by invertebrates than the downstream section. However, chironomid midges were most abundant at the downstream section (NC-G). Thus, any differences in populations that may be related to the length of time in construction is likely taxa specific. These differences are likely related to: 1) differing abilities of invertebrates to rapidly recolonize new substrates; 2) the ability and seasonality of adults to lay eggs in newly reclaimed areas; 3) differences in feeding habits (herbivores vs. collector-gatherers vs. filter feeders) and the availability of appropriate food items in a new habitat. The rapid (albeit initial) changes that have occurred in the invertebrate community in Newton Creek over such a short period of time (months) shows how quickly the community can respond to alterations to their habitat, and that reservoir populations are locally present to provide pioneer individuals for a new habitat. In all likelihood, the downstream sections will quickly become similar in invertebrate community structure to the upstream sections, and that the community within the entire reclaimed section will continue to become more diverse and stable. It is expected that populations and diversity of caddisflies will increase, and eventually the appearance of populations of mayflies, along with other invertebrates.

The most upstream (NC-A) and downstream (NC-L) sections were not reclaimed in 2003.

However, the invertebrate community at these sites also changed somewhat. Midges increased at both sites and this may be due to the overall increase in midges throughout this small watershed. A few dragonflies and damselflies continued to be found at these two sites; the wetlands at the headwater and the mouth of Newton Creek probably harbor the reservoir populations for the individuals that occur in the stream. Even though these two sites were not part of the current reclamation project, the reclaimed section and other sections within the watershed will likely provide reservoir populations of invertebrates that will eventually colonize these sections. The downstream section near the mouth is being planned for a future reclamation project, and this section would undoubtedly benefit from the dredging of contaminated sediments and placement of rock and other types of substrates, similar to what occurred in sections NC-B through NC-G. The upstream section (NC-A) would also likely benefit from the addition of some substrate materials. The sediments and substrates in this section have remained clay, silts, sands, and riparian vegetation. The addition of some rock and/or submerged woody debris would provide more complex, 3-dimensional substrate that would increase surface area for the colonization of invertebrates.

LITERATURE CITED

ENSR. 1995 (April). Investigation of benthic macrofaunal populations and sediment toxicity in Newton Creek/Hog Island Inlet - Fall 1994. Submitted to Murphy Oil USA, Inc., El Dorado, AR. Document Number 4790-016.

Schmude, K.L. 2001 (January). Analysis of macroinvertebrate samples collected September 2000 from Newton Creek, Superior, WI. Report submitted to Wisconsin Department of Natural Resources, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2002a (March). Analysis of macroinvertebrate samples collected October 2001 from Newton Creek, Superior, WI. Report submitted to Wisconsin Department of Natural Resources, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2002b (October). Analysis of macroinvertebrate samples collected from Newton Creek, Superior, WI: July 17, 2002. Report submitted to Murphy Oil Corporation, USA, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2003 (January). Analysis of macroinvertebrate samples collected from Newton Creek, Superior, WI: October 18, 2002. Report submitted to Murphy Oil Corporation, USA, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

SEH. 2000 (September). Site investigation report. Newton Creek segments B & C. WDNR #99RRSU. Superior, WI. Report for the Wisconsin Dept. of Natural Resources.

Submitted by Short Elliott Hendrickson, Inc., Chippewa Falls, WI. SEH #WIDNR9905.00. CD ROM format. (phone 1-800-472-5881)

WI DNR. 1995 (December 1). Newton Creek system sediment contamination site characterization report. Wisconsin Dept. of Natural Resources, PUBL-WR-433-95.

Table 1. Macroinvertebrate data from WI DNR (1995), ENSR (1995), SEH (2000), Schmude (2001, 2002a, 2002b, 2003) and the current study. Data are presented as organisms/m^2, with sample standard deviation in parentheses.

	May 6, 1993 WI DNR	May 23-26, 1994 WI DNR	Sept. 29, 1994 ENSR	Nov. 11, 1999 SEH	Sept. 18-19, 2000 UW-Superior	Oct. 30-31, 2001 UW-Superior	July 17, 2002 UW-Superior	October 18, 2002 UW-Superior	October 30-31, 20 UW-Superior
SITE NC-A									
Chironomidae				14,282 (9133)	6965 (4932)	10,227 (5001)	1763 (935)	6083 (4553)	64,048 (60,808)
Oligochaeta				67,002 (33,709)	17,456 (34,122)	84,105 (60,002)	169,620 (44,822)	59,155 (25,236)	22,833 (23,904)
Mollusca				176 (241)	0	353 (789)	617 (503)	353 (369)	88 (197)
TOTAL				81,548 (34,536)	24,508 (31,958)	94,684 (60,654)	172,000 (45,743)	65,591 (22,132)	87,102 (69,806)
Taxa Richness				8.8 (1.3)	6.0 (1.6)	8.8 (0.8)	6.6 (1.3)	7.8 (2.2)	9.2 (2.0)
SITE NC-B (=NC-2)									
Chironomidae		0	2586 (803)	20,541 (11,314)**	9786 (5348)	9609 (2540)	6612 (2973)	9609 (6135)	15,936 (7937)
Oligochaeta		35,440 (36,857)	4060 (4669)	23,362 (18,673)**	42,581 (35,066)	8992 (5341)	995,855 (582,117)	93,626 (91,418)	7552 (5177)
Mollusca		0	0	353 (789)**	0	0	0	176 (241)	1188 (272)
TOTAL		35,440 (36,857)	6646 (4982)	44,609 (22,050)**	52,543 (38,237)	18,602 (4833)	1,002,467 (582,117)	103,412 (89,572)	27,032 (9575)
Taxa Richness		4.4 (0.9)	3.0 (0)	10.0 (1.6)**	8.0 (1.9)	7.4 (1.5)	9.2 (1.3)	8.0 (2.3)	15.4 (2.9)
SITE NC-C									
Chironomidae				29,710 (28,738)					
Oligochaeta				62,153 (18,774)					
Mollusca				0					
TOTAL				91,863 (34,905)					
Taxa Richness				9.6 (1.9)					
SITE NC-D									
Chironomidae					3615 (3319)	12,519 (4973)	2468 (1986)	4584 (3562)	7977 (4015)
Oligochaeta					14,987 (11,095)	6965 (4903)	35,352 (11,576)	38,482 (39,400)	3554 (1945)
Mollusca					0	0	88 (197)	0	1225 (354)
TOTAL					18,778 (13,517)	19,483 (1956)	37,909 (12,346)	43,066 (38,648)	14,598 (3976)
Taxa Richness					5.8 (1.5)	7.0 (1.6)	6.0 (2.9)	6.2 (1.5)	14.2 (1.6)
SITE NC-F									
Chironomidae				3791 (2999)	14,282 (4794)	23,451 (11,555)	11,637 (4502)	2909 (1191)	20,518 (4508)
Oligochaeta				15,075 (11,932)	5290 (5939)	4761 (2006)	102,706 (23,306)	34,735 (13,462)	3002 (2642)
Mollusca				176 (394)	176 (241)	0	264 (394)	88 (197)	327 (326)
TOTAL				19,043 (12,628)	19,836 (2699)	28,211 (12,609)	114,608 (27,566)	37,732 (14,615)	27,803 (10,288)
Taxa Richness				7.2 (2.2)	8.8 (1.9)	8.4 (1.8)	8.0 (1.6)	6.8 (1.3)	17.2 (2.5)
SITE NC-G (=NC-5)									
Chironomidae	3879 (3860)	793 (197)	3336 (1314)		9345 (5059)	27,770 (8920)	10,844 (5836)	19,660 (31,354)	28,655 (13,738)
Oligochaeta	21,511 (19,879)	28,035 (17,661)	836 (819)		21,776 (22,348)	5730 (6707)	80,226 (21,298)	29,269 (38,982)	6612 (6591)
Mollusca	0	0	0		88 (197)	0	0	88 (197)	131 (191)
TOTAL	25,478 (18,638)	28,828 (17,724)	4172 (1734)		31,297 (24,887)	33,501 (15,278)	91,069 (26,438)	49,017 (43,453)	35,650 (16,471)
Taxa Richness	6.8 (1.5)	5.0 (1.0)	2.4 (0.6)		8.0 (2.5)	8.8 (1.6)	7.2 (1.3)	7.2 (2.5)	15.4 (2.2)
SITE NC-L									
Chironomidae					23,803 (8722)	14,811 (6308)	11,725 (2128)	2204 (1896)	27,859 (7931)
Oligochaeta					19,395 (7128)	18,690 (15,265)	363,924 (70,850	176,056 (84,469)	108,613 (83,819)
Mollusca					1058 (1380)	6876 (10,112)	15,869 (11,448)	1851 (2077)	38,790 (21,923)
Amphipoda					441 (441)	88 (197)	3262 (1105)	5466 (3173)	3262 (2867)
TOTAL					45,050 (14,564)	40,377 (21,777)	391,519 (69,042	180,111 (80,842)	180,023 (76,910)
Taxa Richness					11.8 (2.8)	13.8 (4.0)	10.6 (1.7)	11.0 (0.7)	17.2 (3.1)

** Samples from site NC-B (SEH 2000 report) were collected further upstream within the stream section (see Schmude 2001).

TABLE 2.

Newton Creek Macroinvertebrates
Numbers per Core or Hess Sample - Raw Data
October 30-31, 2003

Taxon	NC-A (Core samples)							NC-B (Hess samples)							NC-D (Hess samples)							NC-F (Hess samples)							NC-G (Hess samples)							NC-L (Core samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																																											
Chironomus	8	10	2	2				60		2	8	8			12	104	36	12	32			84	152	16	48	172			564	64	116	84	388			6	26	12		10		
Dicrotendipes fumidus	2							28		2	4	14							4																	4		2		14		
Endochironomus subtendens grp.																																12	4									
Glyptotendipes sp. grp. A			6	4	5			72	8	6	28	22			16	28	4	12	8			8	4	4		4			4			8						6				
Paracladopelma nais grp.																													20		4	16	8				2	2		4		
Phaenopsectra punctipes grp.																																					2					
Polypedilum aviceps												2											4																			
Polypedilum fallax grp.																								4																		
Polypedilum halterale grp.																							4																			
Polypedilum illinoense grp.									8	6						4		8	8			128	72	196	24	36			20		8	44	24			2						
Polypedilum scalaenum grp.										2																																
TOTAL CHIRONOMINI	10	10	8	6	5	7.8	2.3	160	16	18	40	46	56.0	59.6	28	136	40	32	52	57.6	44.8	220	236	220	72	212	192.0	67.6	608	64	128	164	424	277.6	229.9	12	30	22	0	28	18.4	12.4
Micropsectra	160	28	420	684	75			632	140	254	92	376			60	32	12	16	228			476	640	472	292	184			520	96	232	484	604			16	30	86	68	58		
Paratanytarsus										4		4							4			28	28	12	24	24			80	52	32	136	144			12	4	12	6	14		
TOTAL TANYTARSINI	160	28	420	684	75	273.4	275.0	632	140	258	92	380	300.4	216.4	60	32	12	16	232	70.4	92.3	504	668	484	316	208	436.0	178.3	600	148	264	620	748	476.0	256.2	28	34	98	74	72	61.2	29.5
Corynoneura																								8					4	4												
Cricotopus bicinctus grp.	2			2	2			56	52	46	52	190			28	60	100	76	112			524	408	712	488	240			300	668	672	1632	1380				2	2				
Cricotopus sylvestris grp.	8	2		6	2			640	412	620	648	1594			196	260	256	476	660			436	560	524	608	432			464	464	268	1276	852			4	6	6	4			
Cricotopus/Orthocladius								4			20	6			4		8	12	4			4	8	36	8	4					12	36	40					2		2		
Limnophyes																								4																		
Parametriocnemus																															4											
TOTAL ORTHOCLADIINAE	10	2	0	8	4	4.8	4.1	700	464	666	720	1790	868.0	525.4	228	320	364	564	776	450.4	219.6	964	976	1284	1104	676	1000.8	222.7	768	1136	960	2944	2272	1616.0	945.2	4	8	10	4	6	6.4	2.6
Conchapelopia/Helopelopia	2		2	4	7			152	76	124	100	154			44	48	56	68	160			168	128	96	100	52			64	8	56	92	80			16	8	8	12	26		
Procladius	4			2				80	4	2		2			16	52	4	28	36			32	36	4	8	8			68			32	4			14	14	14	24	18		
Psectrotanypus																													4								4	2		2		
Tanypus			2												4	4																					14	12	14				
TOTAL TANYPODINAE	6	0	4	6	7	4.6	2.8	232	80	126	100	156	138.8	59.4	64	104	60	96	196	104.0	54.9	200	164	100	108	60	126.4	55.4	136	8	56	124	84	81.6	52.0	30	40	36	50	46	40.4	7.9
TOTAL CHIRONOMIDAE	186	40	432	704	91	290.6	275.9	1724	700	1068	952	2372	1363.2	679.0	380	592	476	708	1256	682.4	343.5	1888	2044	2088	1600	1156	1755.2	385.7	2112	1356	1408	3852	3528	2451.2	1175.2	74	112	166	128	152	126.4	36.0
OTHER DIPTERA																																										
Bezzia/Palpomyia (biting midge)								4																																	
Chelifera (dance fly)												2											4																		
Hemerodromia (dance fly)								4	16	44	40	18	24.4	17.0				4	8			8	24	28	16		19.0	8.6		4		4									
Simulium vittatum cmplx (black fly)								52	48	134	232	412	175.6	151.9	12	44	136	524	60	155.2	211.1	80	32	1308	184	4	321.6	555.7	4		64	8	20	24.0	26.6							
TRICHOPTERA																																										
Cheumatopsyche																								4																		
Hydropsyche betteni										2																																
Hydroptila																															4											
ODONATA																																										
Enallagma (damselfly)	2																																			2			10	2		
Plathemis lydia (dragonfly)			1																																							
OLIGOCHAETA																																										
Naididae																																										
Chaetogaster diastrophus																						276	28	8	4	12																
Nais variabilis																																						2				
Enchytraeidae																								4																		
Tubificidae																																										
immature tubificids w/o hairs	84	38	162	12	27			1052	392	854	292	120			168	296	300	64	140			4	8	220	564	20			380	172	92	4	956			720	1018	184	184	268		
immature tubificids with hairs	4	2	12	14	3			144	32	154	108	58			72	132	200	36	88			20		32	36	44			424	248	76	4	456			20	8	4		4		
Limnodrilus cervix																																				4	4	6		2		
Limnodrilus claparedeianus								12																																	
Limnodrilus hoffmeisteri	20	10	116	8	1					2																							8			2	8	10	8	8		
Limnodrilus udekemianus					5					10																															
Potamothrix vejdovskyi																						4										4									
Tubifex tubifex															4		16		4											4											
TOTAL OLIGOCHAETA	108	50	290	34	36	103.6	108.5	1208	424	1020	400	178	646.0	442.9	244	428	516	100	232	304.0	166.4	304	36	264	604	76	256.8	226.0	804	424	168	12	1420	565.6	563.8	746	1038	206	192	282	492.8	380.3
Pisidium (clam)																																				4						
Musculium/Sphaerium (clam)																																						2				
Hydrobiidae (snail)																																					2				
Physa (snail)				2				112	64	126	108	98			120	132	72	72	128			56	60	16	4	4			40	4	4	8				184	96	80	170	334		
Planorbella trivolvis (snail)																																				2	6					
TOTAL MOLLUSCA	0	0	0	2	0	0.4	0.9	112	64	126	108	98	101.6	23.3	120	132	72	72	128	104.8	30.3	56	60	16	4	4	28.0	27.9	40	4	4	8	0	11.2	16.3	190	104	80	172	334	176.0	99.5
Caecidotea communis (sowbug)												1																								20						
Gammarus fasciatus (amphipod)																																				20	14	4	2	34		
TOTAL ORGANISMS	296	90	723	740	127	395.2	316.7	3104	1252	2394	1732	3080	2312.4	819.1	756	1196	1200	1408	1684	1248.8	340.1	2336	2200	3708	2408	1240	2378.4	880.1	2960	1788	1648	3884	4968	3049.6	1409.0	1052	1268	456	504	804	816.8	349.0
TAXA RICHNESS	11	6	9	11	9	9.2	2.0	16	12	19	13	17	15.4	2.9	14	13	13	14	17	14.2	1.6	17	18	21	15	15	17.2	2.5	16	12	16	18	15	15.4	2.2	18	19	20	12	17	17.2	3.1

TABLE 3.

Newton Creek Macroinvertebrates
Numbers per Meter Square - Core or Hess Sample
October 30-31, 2003

Taxon	NC-A (Core samples)							NC-B (Hess samples)							NC-D (Hess samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																					
Chironomus	1763	2204	441	441	0			701	0	23	94	94			140	1216	421	140	374		
Dicrotendipes fumidus	441	0	0	0	0			327	0	23	47	164			0	0	0	0	47		
Endochironomus subtendens grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Glyptotendipes sp. grp. A	0	0	1322	882	1102			842	94	70	327	257			187	327	47	140	94		
Parachironomus arcuatus grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Phaenopsectra punctipes grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum aviceps	0	0	0	0	0			0	0	0	0	23			0	0	0	0	0		
Polypedilum fallax grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum halterale grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum illinoense grp.	0	0	0	0	0			0	94	70	0	0			0	47	0	94	94		
Polypedilum scalaenum grp.	0	0	0	0	0			0	0	23	0	0			0	0	0	0	0		
TOTAL CHIRONOMINI	2204	2204	1763.2	1322.4	1102	1719.1	502.6	1870.4	187.04	210.42	467.6	537.74	654.6	696.9	327.32	1589.84	467.6	374.08	607.88	673.3	523.4
Micropsectra	35264	6171	92568	150754	16530			7388	1637	2969	1075	4395			701	374	140	187	2665		
Paratanytarsus	0	0	0	0	0			0	0	47	0	47			0	0	0	0	47		
TOTAL TANYTARSINI	35264	6171.2	92568	150754	16530	60257.4	60612.7	7388.08	1636.6	3016.02	1075.48	4442.2	3511.7	2529.3	701.4	374.08	140.28	187.04	2712.08	823.0	1078.8
Coryneneura	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Cricotopus bicinctus grp.	441	0	0	441	441			655	608	538	608	2221			327	701	1169	888	1309		
Cricotopus sylvestris grp.	1763	441	0	1322	441			7482	4816	7248	7575	18634			2291	3039	2993	5564	7715		
Cricotopus/Orthocladius	0	0	0	0	0			47	0	0	234	70			47	0	94	140	47		
Limnophyes	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Parametriocnemus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL ORTHOCLADIINAE	2204	441	0	1763	882	1058	914	8183	5424	7786	8417	20925	10147	6142	2665	3741	4255	6593	9071	5265	2567
Conchapelopia/Helopelopia	441	0	441	882	1543			1777	888	1450	1169	1800			514	561	655	795	1870		
Procladius	882	0	0	441	0			935	47	23	0	23			187	608	47	327	421		
Psectrotanypus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Tanypus	0	0	441	0	0			0	0	0	0	0			47	47	0	0	0		
TOTAL TANYPODINAE	1322	0	882	1322	1543	1014	616	2712	935	1473	1169	1824	1623	694	748	1216	701	1122	2291	1216	642
TOTAL CHIRONOMIDAE	40994	8816	95213	155162	20056	64048	60808	20154	8183	12485	11129	27729	15936	7937	4442	6920	5564	8277	14683	7977	4015
OTHER DIPTERA																					
Bezzia/Palpomyia (biting midge)	0	0	0	0	0			47	0	0	0	0			0	0	0	0	0		
Chelifera (dance fly)	0	0	0	0	0			0	0	0	0	23			0	0	0	0	0		
Hemeradromia (dance fly)	0	0	0	0	0			47	187	514	468	210			0	0	0	47	94		
Simulium vittatum complex (black fly)	0	0	0	0	0			608	561	1566	2712	4816	2053	1776	140	514	1590	6126	701	1814	2468
TRICHOPTERA								0	0	0	0	0			0	0	0	0	0		
Cheumatopsyche	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Hydroptyche bettei	0	0	0	0	0			0	0	23	0	0			0	0	0	0	0		
Hydroptila	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
ODONATA	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Enallagma (damselfly)	441	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Plathemis lydia (dragonfly)	0	0	220	0	0			0	0	0	0	0			0	0	0	0	0		
OLIGOCHAETA																					
Naididae																					
Chaetogaster diastrophus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Nais variabilis	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Enchytraeidae		0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Tubificidae																					
immature tubificids w/o hairs	18514	8375	35705	2645	5951			12298	4582	9983	3413	1403			1964	3460	3507	748	1637		
immature tubificids with hairs	882	441	2645	3086	661			1683	374	1800	1263	678			842	1543	2338	421	1029		
Limnodrilus cervix	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus claparedeianus	0	0	0	0	0			140	0	0	0	0			0	0	0	0	0		
Limnodrilus hoffmeisteri	4408	2204	25566	1763	220			0	0	23	0	0			0	0	0	0	0		
Limnodrilus udekemianus	0	0	0	0	1102			0	0	117	0	0			0	0	0	0	0		
Potamothrix vejdovskyi	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Tubifex tubifex	0	0	0	0	0			0	0	0	0	0			47	0	187	0	47		
TOTAL OLIGOCHAETA	23803	11020	63916	7494	7934	22833	23904	14122	4957	11924	4676	2081	7552	5177	2852	5003	6032	1169	2712	3554	1945
Pisidium (clam)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Musculium/Sphaerium (clam)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Hydrobiidae (snail)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Physa (snail)	0	0	0	441	0			1309	748	1473	1263	1146			1403	1543	842	842	1496		
Planorbella trivolvis (snail)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL MOLLUSCA	0	0	0	441	0	88	197	1309	748	1473	1263	1146	1188	272	1403	1543	842	842	1496	1225	354
Caecidotea communis (sowbug)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Gammarus fasciatus (amphipod)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL ORGANISMS	65238	19836	159349	163096	27991	87102	69806	36286	14636	27986	20247	36005	27032	9575	8838	13981	14028	16460	19686	14598	3976
TAXA RICHNESS	11	6	9	11	9	9.2	2.0	16	12	19	13	17	15.4	2.9	14	13	13	14	17	14.2	1.6

Taxon	NC-F (Hess samples)							NC-G (Hess samples)							NC-L (Core samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																					
Chironomus	982	1777	187	561	2011			6593	748	1356	982	4536			1322	5730	2645	0	2204		
Dicrotendipes fumidus	0	0	0	0	0			0	0	0	140	47			882	0	441	0	3086		
Endochironomus subtendens grp.	0	0	0	0	0			47	0	0	94	0			0	0	1322	0	0		
Glyptotendipes sp. grp. A	94	47	47	0	47			234	0	47	187	94			0	441	441	0	882		
Parachironomus arcuatus grp.	0	0	0	0	0			0	0	0	0	0			0	441	0	0	0		
Phaenopsectra punctipes grp.	0	47	0	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum aviceps	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum fallax grp.	0	0	47	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum halterale grp.	0	47	0	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum illinoense grp.	1496	842	2291	281	421			234	0	94	514	281			441	0	0	0	0		
Polypedilum scalaenum grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL CHIRONOMINI	2571.8	2758.84	2571.8	841.68	2478.28	2244.5	790.8	7107.52	748.16	1496.32	1917.16	4956.56	3245.1	2688.1	2644.8	6612	4848.8	0	6171.2	4055	2742
Micropsectra	5564	7482	5518	3413	2151			6079	1122	2712	5658	7061			3526	6612	18954	14987	12783		
Paratanytarsus	327	327	140	281	281			935	608	374	1590	1683			2645	882	2645	1322	3086		
TOTAL TANYTARSINI	5891.76	7808.92	5657.96	3694.04	2431.52	5096.8	2084.1	7014	1730.12	3086.16	7247.8	8744.12	5564.4	2995.4	6171.2	7493.6	21599.2	16309.6	15868.8	13488.5	6497.9
Coryneneura	0	0	94	0	0			47	47	0	0	0			0	0	0	0	0		
Cricotopus bicinctus grp.	6126	4770	8323	5705	2806			3507	7809	7856	19078	16132			0	441	441	0	0		
Cricotopus sylvestris grp.	5097	6546	6126	7108	5050			5424	5424	3133	14916	9960			882	1322	1322	882	0		
Cricotopus/Orthocladius	47	94	421	94	47			0	0	140	421	468			0	0	441	0	441		
Limnophyes	0	0	47	0	0			0	0	47	0	0			0	0	0	0	882		
Parametriocnemus	0	0	0	0	0			0	0	47	0	0			0	0	0	0	0		
TOTAL ORTHOCLADIINAE	11269	11409	15010	12906	7902	11699	2603	8978	13280	11222	34415	26560	18891	11050	882	1763	2204	882	1322	1411	575
Conchapelopia/Helopelopia	1964	1496	1122	1169	608			748	94	655	1075	935			3526	1763	1763	2645	5730		
Procladius	374	421	47	94	94			795	0	0	374	47			3086	3086	3086	5290	3967		
Psectrotanypus	0	0	0	0	0			47	0	0	0	0			0	882	441	0	441		
Tanypus	0	0	0	0	0			0	0	0	0	0			0	3086	2645	3086	0		
TOTAL TANYPODINAE	2338	1917	1169	1263	701	1478	648	1590	94	655	1450	982	954	608	6612	8816	7934	11020	10138	8964	1747
TOTAL CHIRONOMIDAE	22071	23894	24409	18704	13514	20518	4508	24689	15852	16460	45030	41242	28655	13738	16310	24685	36586	28211	33501	27859	7931
OTHER DIPTERA																					
Bezzia/Palpomyia (biting midge)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Chelifera (dance fly)	0	47	0	0	0			0	0	0	0	0			0	0	0	0	0		
Hemeradromia (dance fly)	94	281	327	187	0			0	47	0	47	0			0	0	0	0	0		
Simulium vittatum complex (black fly)	935	374	15291	2151	47	3760	6496	47	0	748	94	234	224	306	0	0	0	0	0		
TRICHOPTERA																					
Cheumatopsyche	0	0	47	0	0			0	0	0	0	0			0	0	0	0	0		
Hydroptyche bettei	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Hydroptila	0	0	0	0	0			0	0	47	0	0			0	0	0	0	0		
ODONATA	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Enallagma (damselfly)	0	0	0	0	0			0	0	0	0	0			441	0	0	2204	441		
Plathemis lydia (dragonfly)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
OLIGOCHAETA																					
Naididae																					
Chaetogaster diastrophus	3226	327	94	47	140			0	0	0	0	0			0	0	0	0	0		
Nais variabilis	0	0	0	0	0			0	0	0	0	0			0	0	441	0	0		
Enchytraeidae	0	0	47	0	0			0	0	0	0	0			0	0	0	0	0		
Tubificidae																					
immature tubificids w/o hairs	47	94	2572	6593	234			4442	2011	1075	47	11176			158688	224367	40554	40554	59067		
immature tubificids with hairs	234	0	374	421	514			4957	2899	888	47	5331			4408	1763	882	0	882		
Limnodrilus cervix	0	0	0	0	0			0	0	0	0	0			882	882	1322	0	441		
Limnodrilus claparedeianus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus hoffmeisteri	0	0	0	0	0			0	0	0	0	94			441	1763	2204	1763	1763		
Limnodrilus udekemianus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Potamothrix vejdovskyi	47	0	0	0	0			0	0	0	47	0			0	0	0	0	0		
Tubifex tubifex	0	0	0	0	0			0	47	0	0	0			0	0	0	0	0		
TOTAL OLIGOCHAETA	3554	421	3086	7061	888	3002	2642	9399	4957	1964	140	16600	6612	6591	164418	228775	45402	42317	62153	108613	83819
Pisidium (clam)	0	0	0	0	0			0	0	0	0	0			882	0	0	0	0		
Musculium/Sphaerium (clam)	0	0	0	0	0			0	0	0	0	0			0	0	0	441	0		
Hydrobiidae (snail)	0	0	0	0	0			0	0	0	0	0			0	441	0	0	0		
Physa (snail)	655	701	187	47	47			468	47	47	94	0			40554	21158	17632	37468	73614		
Planorbella trivolvis (snail)	0	0	0	0	0			0	0	0	0	0			441	1322	0	0	0		
TOTAL MOLLUSCA	655	701	187	47	47	327	326	468	47	47	94	0	131	191	41876	22922	17632	37909	73614	38790	21923
Caecidotea communis (sowbug)	0	0	0	0	0			0	0	0	0	0			4408	0	0	0	0		
Gammarus fasciatus (amphipod)	0	0	0	0	0			0	0	0	0	0			4408	3086	882	441	7494	3262	2867
TOTAL ORGANISMS	27308	25718	43347	28150	14496	27803	10288	34602	20902	19265	45404	58076	35650	16471	231861	279467	100502	111082	177202	180023	76910
TAXA RICHNESS	17	18	21	15	15	17.2	2.5	16	12	16	18	15	15.4	2.2	18	19	20	12	17	17.2	3.1

ANALYSIS OF MACROINVERTEBRATE SAMPLES COLLECTED FROM NEWTON CREEK and HOG ISLAND INLET AREA, SUPERIOR, WI: JUNE 6-15, 2006

Report submitted to:

Mr. Mark Broses
SEH, Inc.
421 Frenette Drive
Chippewa Falls, WI 54729

Submitted by:

Kurt L. Schmude, Ph.D.
Senior Scientist
Lake Superior Research Institute (LSRI)
University of Wisconsin-Superior (UW-Superior)
801 N. 28th Street
Superior, WI

September 18, 2006

INTRODUCTION

This report is similar in format to Schmude (2001, 2002a,b,c, 2003, 2004). It provides information and data on the benthic macroinvertebrate samples that were collected in 2006 from six sections of Newton Creek and four sites in the Hog Island Inlet Area of the Superior Harbor of Lake Superior.

METHODS

COLLECTION OF SAMPLES

Samples were collected on June 6-7, 2006 from Newton Creek. Locations of sites were the same as those used in previous studies and included the following sections of the stream:

1. NC-A
2. NC-B
3. NC-D
4. NC-F
5. NC-G
6. NC-L

The collection of samples from sites NC-A and NC-L followed the same procedures performed during previous sampling events (Schmude 2001, 2002a,b, 2003, 2004). The bottom substrate at site NC-A was mainly clay with a thin layer of sand and debris. The substrate at site NC-L was silt and some sand near the shoreline and large cobble in the middle of the channel. Due to the type of substrate at NC-A and the excessive depth of the water at site NC-L, the Hess sampler that was used at the other sites in Newton Creek could not be used effectively at these two sites. Consequently, a core sampler was used by Kurt Schmude who collected all replicates at these sites. At site NC-L, the cobble substrate throughout the middle of the channel, and the mesh netting that was placed on the bottom sediments to assist in the landscaping of the riparian zone and shallow areas, prevented the effective use of the core sampler in the middle of the stream and along the shallow shoreline. A narrow area of soft sediments was located between the mesh netting and the cobble substrate, approximately a quarter of the distance across the width of the channel. The substrate in this area was not covered by netting or rock and allowed for the effective use of the core sampler.

A Hess sampler (Wildlife Supply Company) was used at sites NC-B, NC-D, NC-F, and NC-G following the procedures used in Schmude (2004). Kurt Schmude and two student assistants operated the Hess sampler and took turns collecting the replicate samples at all four sites.

Core samples were collected from the four sites in Hog Island Inlet following the same procedures used in WI DNR (1995) and Schmude (2002c). Kurt Schmude collected all replicates at these four sites.

LABORATORY PROCESSING

Core samples from Newton Creek were sieved in the field and processed in the lab using a 250-µm mesh sieve. All replicates from sites NC-A and NC-L were split into halves in the laboratory following the same procedures established in previous studies. Although Hess samples were

collected in the field using a 363-μm mesh net, minimal sieving was performed in the field. The samples were more thoroughly sieved in the lab using a 250-μm mesh sieve. All replicates from sites NC-B, NC-D, NC-F, and NC-G were split into quarters.

Core samples from Hog Island Inlet Area were sieved in the field and processed in the lab using a 250-μm mesh sieve. All replicates were split into halves in the laboratory following the same procedures established in previous studies.

After the samples were split into subsamples, the portion of the sample that was not randomly chosen for picking analysis was examined for large/rare organisms. Large/rare specimens were added to the samples for analysis. The only specimens retrieved from the samples in this manner were crayfish.

ANALYSIS

Data from the core samples (both Newton Creek and Hog Island) were multiplied by 2 to correct for the splitting technique (large/rare specimens were not multiplied by 2). The coring device captured an area of 0.00453 m^2, and the data were further multiplied by the correction factor of 220.4 to obtain organisms/m^2.

Data from the Hess samples were multiplied by 4 to correct for the splitting technique (large/rare specimens were not multiplied by 4). The Hess sampler captured an area of 0.08553 m^2, and the data were further multiplied by the correction factor of 11.69 to obtain organisms/m^2.

No statistical tests were performed on the data.

QUALITY CONTROL

Five samples were randomly chosen (from batches of 10 samples) to be examined for splitting accuracy. There was an average splitting error of 8.3% among the core samples, and an average splitting error of 6.9% for the Hess samples.

SPLITTING SAMPLES

	Number of Organisms			
Sample	1st Half	2nd Half	% Error	Type of sample
HI-1 rep. 1	15	20	14.3	core sample
HI-10 rep. 5	22	23	2.2	core sample
NC-L rep. 1	107	86	10.9	Hess sample
	Quarter	Quarter		
NC-B rep. 2	715 (1st)	548 (3rd)	6.6	Hess sample
NC-F rep. 4	1678 (1st)	1574 (3rd)	3.2	Hess sample

PICKING SAMPLES

Eight samples were randomly chosen for Quality Control, resulting in an overall picking error of 5.0%.

Sample	Number of Organisms 1st Pick	2nd Pick	Total	%Error
Loon's Foot rep.3	60	5	65	7.7
HI-1 rep. 1	15	2	17	11.8
HI-30 rep. 5	2	0	2	0
NC-B rep. 4	467	31	498	6.2
NC-D rep.2	922	76	998	7.6
NC-F rep. 1	1717	53	1770	3.0
NC-G rep.1	1290	66	1356	4.9
NC-L rep.3	34	4	38	10.5
Total	4507	237	4744	5.0

RESULTS and DISCUSSION

A summary of the current data and the data obtained from all previous and comparable studies on Newton Creek and Hog Island Inlet Area is presented in Tables 1 and 2. Detailed data from the current study are presented in Tables 3 and 5 (raw data) and Tables 4 and 6 (organisms/m^2).

NEWTON CREEK

Site NC-A

This site was not included in the reclamation of the stream in 2003. The overall fauna remained fairly consistent with the fauna that was observed in 2003 (Table 1). A taxa richness value of 9.2 was the exact same value obtained in 2003, which at that time represented the highest value for this site over the previous five sampling events, spanning five years. However, the density of total organisms (56,422 organisms/m^2) was down 35% compared to 2003 (87,102 organisms/m^2), but it was still higher than the lowest value observed at this site in September of 2000 (24,508 organisms/m^2). Chironomid midges showed a decrease of 33% in density, while oligochaete worms decreased 44%. This difference may be due to a seasonal difference in macroinvertebrate abundance. For the current study, samples were collected in early June compared to mid October to mid November in four of the previous six sampling events that occurred at this site. When the data were compared to the data collected in mid July in 2002, total organisms were three times more abundant in 2002 than in 2006. This situation was due to a very high density of oligochaete worms and a very low density of chironomid midges. It appears that the composition of the macroinvertebrate community at this site can change considerably, and that seasonality is likely at least a partial explanation for this change.

For the chironomid midges, *Micropsectra* was again the dominate midge (Table 4). *Cricotopus bicinctus* group and *Glyptotendipes* species group A were also abundant at this site for the first time. All three taxa are tolerant midges to organic pollution and disturbance. Another species of fly that appeared for the first time at this site was the black fly *Simulium vittatum* complex. In all likelihood, the larvae and pupae represent *Simulium tribulatum*, but chromosomal analysis is required for positive identification, which was not performed. *Simulium tribulatum* is perhaps the most abundant species of black fly east of the Rocky Mountains, and it is probably the most

pollution-tolerant black fly in North America; it is often among the few aquatic insects in organically fouled watercourses (Adler et al. 2004). For the oligochaete worms, *Limnodrilus hoffmeisteri* (a pollution tolerant species) was less abundant in 2006 compared to 2003, but this may be due to seasonality. In July of 2002, *L. hoffmeisteri* was also uncommon, but another pollution tolerant species, *Limnodrilus udekemianus*, was quite abundant; *L. udekemianus* was uncommon in the current study.

Sites NC-B, NC-D, NC-F, and NC-G

As in 2003, the faunas at these four sites were similar to each other and represented a drastic change from the fauna observed in years before the reclamation project (Table 1). Taxa richness values in 2006 at all four sites increased compared to values observed in 2003, ranging from 18.8 to 25.4 (the highest value recorded from the entire stream to date); in 2003 they ranged from 14.2 to 17.2. Before the reclamation of the stream, taxa richness values ranged from 4.4 (Site NC-B, 1994) to 10.0 (Site NC-B, 1999), but were generally in the 6-9 range. The increases in taxa richness were due to greater diversity of chironomid midges, snails, and miscellaneous taxa.

Densities of total organisms at all four sites increased 22-167% compared to densities collected in 2003 (Table 1). Densities of chironomid midges and oligochaete worms (treated separately) ranged from 5546-17,579 organisms/m^2 and were very similar to totals collected in 2003. Comparative dominance of midges versus worms was reversed at sites NC-F and NC-G in 2006 compared to 2003, but this may be due to seasonal variation. The driving force for the overall increases in total densities was the result of dramatic increases in black flies, snails, and sowbugs (Isopoda). Black flies were 2.5-14.4 times more abundant in 2006 than in 2003, and snails were 1.5-23 times more abundant. Sowbugs were not present at any of the four sites during any of the previous sampling events. In 2006, sowbugs appeared at sites NC-B and NC-D (37-65 organisms/m^2) and were very abundant at sites NC-F and NC-G (11,849-35,640 organisms/m^2). The common fauna at these four sites has changed from one that was dominated by two major groups (midges and worms) and 2 to 10 different taxa from 1993 to 2002, to a fauna whose dominance is shared by five major groups and possesses 18-25 different taxa.

Notable discoveries included the first-time collection of larval beetles in several different families, especially riffle beetles (family Elmidae) (Table 4). Larvae of *Optioservus fastiditus* and *Stenelmis* sp. were collected, and although both are fairly tolerant to at least some organic pollution, their occurrence in Newton Creek at all four of these sites represent another step forward in the colonization of this stream by a more diverse, lotic (flowing water) macroinvertebrate community.

In 2003, single specimens of the caddisflies *Cheumatopsyche* sp., *Hydropsyche betteni* (both Hydropsychidae), and *Hydroptila* sp. (Hydroptilidae) (Table 4) occurred within this stretch of the stream, and this possibly indicated that water quality had improved to the point where the generally intolerant caddisflies could now survive. However, no larvae of these three taxa were found in 2006. Instead, two specimens of the genus *Anabolia* (Limnephilidae) were captured. This group is somewhat tolerant of organic pollution and disturbance. Its presence indicates that the water quality has improved to the point where caddisflies are still present, even though their

numbers are very low. In addition to *Anabolia*, one specimen in the mayfly family Baetidae was collected and this represents the first specimen of a mayfly to be collected from Newton Creek. In general, mayflies are even more intolerant to organic pollution and disturbance than caddisflies.

Crayfish were represented for the first time in these biomonitoring studies. Five specimens of *Orconectes virilis* were discovered in the large/rare portions of the sample at sites NC-D and NC-F. This group has become established at various sites in the stream (personal knowledge).

Another aquatic macroinvertebrate that appeared for the first time was the snail family Lymnaeidae (Table 4), specifically *Stagnicola catascopium*, which is another species that is fairly tolerant to organic pollution and disturbance. This species was present at all four sites, but absent at sites NC-A and NC-L. Even though the Mollusca were represented by four taxa of snails (*Gyraulus, Physa, Stagnicola,* and *Valvata*) at one or more of these four sites, fingernail clams were still absent. Fingernail clams require decent water quality, and would eventually be expected to colonize the stream if water quality continues to improve.

Site NC-L

The fauna at this site decreased in diversity (Table 1). The taxa richness value (5.8) was 45-66% lower than all values obtained during the previous five studies, spanning the last six years. Densities of total organisms (22,393 organisms/m^2) were also 45-88% lower than all values obtained during the previous five studies. Oligochaete worms and molluscs were considerably lower in abundance, and amphipods (scuds) were absent for the first time compared to the past five studies. Chironomid midges were lower in abundance in all but one of the last five studies; only four taxa of midges were collected in the current study compared to 16 taxa in 2003 (Schmude 2004).

The decreases in diversity and abundance of macroinvertebrates at this site are likely the result of 1) the recent reclamation activity of the stream within the last 4-8 months of the sampling event, 2) a new substrate (rock/rubble) across much of the bottom of the stream, 3) and no growth of submerged and emergent vegetation. In the previous studies, the substrate was more silty and sandy, and aquatic vegetation was present. Submerged and emergent vegetation provides habitat and food for macroinvertebrates, particularly snails, scuds, and some midges, along with many miscellaneous groups.

This site is currently in the early stages of post-reclamation. Recolonization of aquatic macroinvertebrates will take time. Factors that will stimulate increases of aquatic macroinvertebrates include growth of periphyton on the new rock/rubble substrate, the re-seeding and growth of submerged and emergent vegetation, and the input of organic debris or detritus (e.g. fallen leaves in the autumn), all of which will provide habitat and food.

HOG ISLAND INLET AREA

Loon's Footing Landing

This site is considered the control site by which the sites within Hog Island Inlet Area (HI-1, HI-

10, and HI-30) will be compared. Taxa richness (18.4) was lower in 2006 compared to 2002 (23.4), but still higher than in 1994 (11.6) (Table 2). On the other hand, total density was higher in 2006 (50,156 organisms/m²) compared to both previous studies. Chironomid density (12,783 organisms/m²) was nearly identical to the density in 1994, but was 50% lower than in 2002. Molluscs were also lower in density in 2006 (1940 organisms/m²) compared to 2002 (3590 organisms/m²), and scuds were absent in 2006. The reason for the 31% increase in total density in the current study compared to 2002 was the 4.6-fold increase in oligochaete worms. The worms were mainly comprised of immature tubificine worms, but 11 species of naidine worms were also collected. Naidine worms can be common in situations where detritus and submerged and emergent vegetation are abundant, all of which were present at this site.

Sites HI-1, HI-10, and HI-30

The benthic macroinvertebrate communities at each of these three sites were very similar to each other, and all three were quite diminished. Taxa richness values ranged from 3.4 to 6.8, and total densities were quite low, ranging from 271-3262 organisms/m² (Table 2). The values for sites HI-1 and HI-30 were considerably lower than values obtained at these two sites in previous studies. The lower values were due mainly to much lower densities of oligochaetes worms in 2006. Site HI-10 was not sampled for aquatic macroinvertebrates during the past four studies.

As with site NC-L in Newton Creek, sites HI-10 and HI-30 are in the early stages of post-reclamation. The substrate at these two sites was mainly clay because all of the overlying organic substrate was removed. There was very little surficial organic debris, which would be required in order for an aquatic macroinvertebrate community to flourish. Once organic debris begins to re-accumulate in the bay, aquatic macroinvertebrates should recolonize the substrate, and taxa richness and densities should increase. The timeline for these events is unknown. The initial recolonization of aquatic macroinvertebrates in Newton Creek took only a few months, but organic debris accumulated very rapidly in this shallow habitat. Accumulation of organic debris in the bay will likely take a longer period of time due to the larger and deeper area that the bay encompasses. In addition, the types of organisms that colonize shallow, lotic water are different than those that colonize deep, still (lentic) water.

Site HI-1, however, had an overlying layer of organic matter and was outside the boundary of the reclamation project. Consequently, sediments were not removed from this site. It is not clear why the macroinvertebrate fauna was as diminished at this site as it was at the two sites where sediments had been removed. Total densities were 97-99% lower than densities collected in 1993, 1994, and 2002. Seasonal variation likely had little impact on this drastic change because even though samples were collected at a different season of the year in 2002 (September), samples were collected at nearly the same time of the year in 1993 and 1994 (May).

LITERATURE CITED

Adler, P.H., D.C. Currie, and D.M. Wood. 2004. The Black Flies (Simuliidae) of North America. Cornell University Press, Ithaca, New York.

ENSR. 1995 (April). Investigation of benthic macrofaunal populations and sediment toxicity in Newton Creek/Hog Island Inlet - Fall 1994. Submitted to Murphy Oil USA, Inc., El Dorado, AR. Document Number 4790-016.

Schmude, K.L. 2001 (January). Analysis of macroinvertebrate samples collected September 2000 from Newton Creek, Superior, WI. Report submitted to Wisconsin Department of Natural Resources, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2002a (March). Analysis of macroinvertebrate samples collected October 2001 from Newton Creek, Superior, WI. Report submitted to Wisconsin Department of Natural Resources, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2002b (October). Analysis of macroinvertebrate samples collected from Newton Creek, Superior, WI: July 17, 2002. Report submitted to Murphy Oil Corporation, USA, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2002c (December). Analysis of macroinvertebrate samples collected September 2002 from Hog Island Inlet, Superior, WI. Report submitted to SEH, Inc., Chippewa Falls, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2003 (January). Analysis of macroinvertebrate samples collected from Newton Creek, Superior, WI: October 18, 2002. Report submitted to Murphy Oil Corporation, USA, Superior, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

Schmude, K.L. 2004 (February). Analysis of macroinvertebrate samples collected from Newton Creek, Superior, WI: October 30-31, 2003. Report submitted to SHE, Inc., Chippewa Falls, WI. Submitted by Lake Superior Research Institute, University of Wisconsin in Superior.

SEH. 2000 (September). Site investigation report. Newton Creek segments B & C. WDNR #99RRSU. Superior, WI. Report for the Wisconsin Dept. of Natural Resources. Submitted by Short Elliott Hendrickson, Inc., Chippewa Falls, WI. SEH #WIDNR9905.00. CD ROM format. (phone 1-800-472-5881)

WI DNR. 1995 (December 1). Newton Creek system sediment contamination site characterization report. Wisconsin Dept. of Natural Resources, PUBL-WR-433-95.

Table 1. Macroinvertebrate data from WI DNR (1995), ENSR (1995), SEH (2000), Schmude (2001, 2002a, b, 2003, 2004) and the current study. Data are presented as organisms/m^2, with sample standard deviation in parentheses.

	May 6, 1993 WI DNR	May 23-26, 1994 WI DNR	Sept. 29, 1994 ENSR	Nov. 11, 1999 SEH	Sept. 18-19, 2000 UW-Superior	Oct. 30-31, 2001 UW-Superior	July 17, 2002 UW-Superior	October 18, 2002 UW-Superior	October 30-31, 2003 UW-Superior	June 6-7, 2006 UW-Superior
SITE NC-A										
Chironomidae				14,282 (9133)	6965 (4932)	10,227 (5001)	1763 (935)	6083 (4553)	64,048 (60,808)	43,463 (64,496)
Simuliidae				0	0	0	0	0	0	353 (369)
Oligochaeta				67,002 (33,709)	17,456 (34,122)	84,105 (60,002)	169,620 (44,822)	59,155 (25,236)	22,833 (23,904)	12,166 (5203)
Mollusca				176 (241)	0	353 (789)	617 (503)	353 (369)	88 (197)	441 (763)
Isopoda				0	0	0	0	0	0	0
TOTAL				81,548 (34,536)	24,508 (31,958)	94,684 (60,654)	172,000 (45,743)	65,591 (22,132)	87,102 (69,806)	56,422 (69,106)
Taxa Richness				8.8 (1.3)	6.0 (1.6)	8.8 (0.8)	6.6 (1.3)	7.8 (2.2)	9.2 (2.0)	9.2 (2.8)
SITE NC-B (=NC-2)										
Chironomidae		0	2586 (803)	20,541 (11,314)*	9786 (5348)	9609 (2540)	6612 (2973)	9609 (6135)	15,936 (7937)	14,093 (9474)
Simuliidae		0	0	0	0	0	0	0	2053 (1776)	11,933 (7602)
Oligochaeta		35,440 (36,857)	4060 (4669)	23,362 (18,673)*	42,581 (35,066)	8992 (5341)	995,855 (582,117)	93,626 (91,418)	7552 (5177)	6415 (10,756)
Mollusca		0	0	353 (789)*	0	0	0	176 (241)	1188 (272)	2319 (2478)
Isopoda		0	0	0	0	0	0	0	0	37 (39)
TOTAL		35,440 (36,857)	6646 (4982)	44,609 (22,050)*	52,543 (38,237)	18,602 (4833)	1,002,467 (582,117)	103,412 (89,572)	27,032 (9575)	35,444 (18,923)
Taxa Richness		4.4 (0.9)	3.0 (0)	10.0 (1.6)*	8.0 (1.9)	7.4 (1.5)	9.2 (1.3)	8.0 (2.3)	15.4 (2.9)	18.8 (5.3)
SITE NC-C										
Chironomidae				29,710 (28,738)						
Oligochaeta				62,153 (18,774)						
Mollusca				0						
TOTAL				91,863 (34,905)						
Taxa Richness				9.6 (1.9)						
SITE NC-D										
Chironomidae					3615 (3319)	12,519 (4973)	2468 (1986)	4584 (3562)	7977 (4015)	16,927 (4851)
Simuliidae					0	0	0	0	1814 (2468)	10,456 (5563)
Oligochaeta					14,987 (11,095)	6965 (4903)	35,352 (11,576)	38,482 (39,400)	3554 (1945)	8443 (842)
Mollusca					0	0	88 (197)	0	1225 (354)	1945 (521)
Isopoda					0	0	0	0	0	65 (53)
TOTAL					18,778 (13,517)	19,483 (1956)	37,909 (12,346)	43,066 (38,648)	14,598 (3976)	38,992 (3559)
Taxa Richness					5.8 (1.5)	7.0 (1.6)	6.0 (2.9)	6.2 (1.5)	14.2 (1.6)	19.4 (1.5)
SITE NC-F										
Chironomidae				3791 (2999)	14,282 (4794)	23,451 (11,555)	11,637 (4502)	2909 (1191)	20,518 (4508)	5546 (1959)
Simuliidae				0	0	0	0	0	3760 (6496)	9268 (11,831)
Oligochaeta				15,075 (11,932)	5290 (5939)	4761 (2006)	102,706 (23,306)	34,735 (13,462)	3002 (2642)	17,579 (8530)
Mollusca				176 (394)	176 (241)	0	264 (394)	88 (197)	327 (326)	2595 (1397)
Isopoda				0	0	0	0	0	0	34,640 (11,202)
TOTAL				19,043 (12,628)	19,836 (2699)	28,211 (12,609)	114,608 (27,566)	37,732 (14,615)	27,803 (10,288)	70,168 (11,193)
Taxa Richness				7.2 (2.2)	8.8 (1.9)	8.4 (1.8)	8.0 (1.6)	6.8 (1.3)	17.2 (2.5)	25.4 (1.8)
SITE NC-G (=NC-5)										
Chironomidae	3879 (3860)	793 (197)	3336 (1314)		9345 (5059)	27,770 (8920)	10,844 (5836)	19,660 (31,354)	28,655 (13,738)	9165 (3282)
Simuliidae	0	0	0		0	0	0	0	224 (306)	3217 (4248)
Oligochaeta	21,511 (19,879)	28,035 (17,661)	836 (819)		21,776 (22,348)	5730 (6707)	80,226 (21,298)	29,269 (38,982)	6612 (6591)	16,319 (15,224)
Mollusca	0	0	0		88 (197)	0	0	88 (197)	131 (191)	3002 (2848)
Isopoda	0	0	0		0	0	0	0	0	11,849 (6635)
TOTAL	25,478 (18,638)	28,828 (17,724)	4172 (1734)		31,297 (24,887)	33,501 (15,278)	91,069 (26,438)	49,017 (43,453)	35,650 (16,471)	43,646 (19,765)
Taxa Richness	6.8 (1.5)	5.0 (1.0)	2.4 (0.6)		8.0 (2.5)	8.8 (1.6)	7.2 (1.3)	7.2 (2.5)	15.4 (2.2)	19.2 (0.8)
SITE NC-L										
Chironomidae					23,803 (8722)	14,811 (6308)	11,725 (2128)	2204 (1896)	27,859 (7931)	8640 (4702)
Simuliidae					0	0	0	0	0	0
Oligochaeta					19,395 (7128)	18,690 (15,265)	363,924 (70,850	176,056 (84,469)	108,613 (83,819)	13,224 (11,371)
Mollusca					1058 (1380)	6876 (10,112)	15,869 (11,448)	1851 (2077)	38,790 (21,923)	441 (540)
Amphipoda					441 (441)	88 (197)	3262 (1105)	5466 (3173)	3262 (2867)	0
Isopoda					0	88 (197)	0	1058 (503)	882 (1971)	88 (197)
TOTAL					45,050 (14,564)	40,377 (21,777)	391,519 (69,042	180,111 (80,842)	180,023 (76,910)	22,393 (12,142)
Taxa Richness					11.8 (2.8)	13.8 (4.0)	10.6 (1.7)	11.0 (0.7)	17.2 (3.1)	5.8 (1.6)

** Samples from site NC-B (SEH 2000 report) were collected further upstream within the stream section (see Schmude 2001).

TABLE 2. Summary of macroinvertebrate data collected in 1993 and 1994 from Hog Island Inlet Area and reference sites (WI DNR 1995, Schmude 2003c) and current study (2006). Data are organisms/m^2 with sample deviation in parenthesis.

	CORE SAMPLES		HESTER DENDY SAMPLES	CORE SAMPLES	
	May 1993	May 1994	May 1993	September 2002	June 2006
SITE HI-1					
Chironomidae	15,472 (2628)	18,778 (7276)	3896 (564)	10,359 (2990)	131 (73)
Oligochaeta	19,836 (8860)	12,078 (6772)	3090 (1050)	84,237 (36,097)	547 (395)
Mollusca	220 (220)	485 (424)	690 (337)	4496 (2106)	0
Amphipoda	0	0	98 (185)	9521 (4345)	0
TOTAL	35,573 (10,621)	32,707 (14,306)	8072 (1798)	109,010 (44,220)	678 (422)
Taxa Richness	9.6 (1.34)	13.4 (4.34)	23.8 (1.79)	23.8 (5.17)	6.2 (1.5)
SITE HI-10					
Chironomidae					56 (35)
Oligochaeta					210 (147)
Mollusca					0
Amphipoda					0
TOTAL					271 (172)
Taxa Richness					6.8 (3.4)
SITE HI-13					
Chironomidae	1807 (2271)	1807 (1084)		2072 (1309)	
Oligochaeta	4584 (4017)	14,679 (9348)		26,977 (9603)	
Mollusca	132 (197)	705 (591)		10,623 (6684)	
Amphipoda	0	0		2953 (1881)	
TOTAL	6656 (6039)	17,852 (10,844)		43,154 (13,044)	
Taxa Richness	5.6 (2.70)	9.2 (2.77)		17.8 (2.95)	
SITE HI-16					
Chironomidae	3482 (2082)				
Oligochaeta	29,357 (14,949)				
Mollusca	44 (99)				
Amphipoda	0				
TOTAL	33,016 (16,741)				
Taxa Richness	11.8 (3.27)				
SITE HI-27					
Chironomidae		2028 (1652)		7185 (5085)	
Oligochaeta		16,266 (9299)		57,745 (17,253)	
Mollusca		0		9962 (3040)	
Amphipoda		0		13,885 (6142)	
TOTAL		18,337 (10,779)		89,262 (20,565)	
Taxa Richness		7.0 (2.00)		18.8 (4.02)	
SITE HI-30					
Chironomidae		176 (241)			1587 (1149)
Oligochaeta		27,770 (19,799)			1587 (2173)
Mollusca		176 (241)			0
Amphipoda		0			0
TOTAL		28,123 (19,808)			3262 (2544)
Taxa Richness		6.6 (1.52)			3.4 (2.1)
SITE IN-1					
Chironomidae	14,502 (6362)	11,284 (4246)	179 (68)		
Oligochaeta	5774 (5458)	10,182 (5678)	125 (127)		
Mollusca	1940 (1095)	3394 (1300)	35 (29)		
Amphipoda	88 (197)	0	78 (78)		
TOTAL	23,759 (9993)	27,286 (11,504)	815 (482)		
Taxa Richness	17.8 (4.32)	22.0 (4.36)	25.0 (5.48)		
SITE WL-2 (Loon's Foot Landing)					
Chironomidae		12,827 (2706)		25,175 (6711)	12,783 (4308)
Oligochaeta		3791 (1279)		7538 (3670)	35,264 (16,181)
Mollusca		44 (99)		3570 (754)	1940 (394)
Amphipoda		0		1322 (1256)	0
TOTAL		17,808 (4074)		38,306 (5531)	50,516 (20,124)
Taxa Richness		11.6 (2.41)		23.4 (5.41)	18.4 (5.3)

TABLE 3.

Newton Creek Macroinvertebrates

Numbers per Core or Hess Sample - Raw Data

June 6-7, 2006

Taxon	NC-A (Core samples)							NC-B (Hess samples)							NC-D (Hess samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																					
Chironomus	6	14						4	4	4		12			12	36	32	12	20		
Glyptotendipes sp. grp. A	94	16	8		26			24	16	48	8	24			4			4			
Polypedilum										4											
Polypedilum illinoense grp.												4									
TOTAL CHIRONOMINI	100	30	8	0	26	32.8	39.6	28	20	56	8	40	30.4	18.5	16	36	32	16	20	24.0	9.4
Microspectra	602	28	26	30	58			2008	840	424	248	348			1096	1800	1296	576	1156		
Paratanytarsus																					
Tanytarsus																					
TOTAL TANYTARSINI	602	28	26	30	58	148.8	253.7	2008	840	424	248	348	773.6	725.9	1096	1800	1296	576	1156	1184.8	438.8
Cricotopus bicinctus grp.	16	4	16		12			388	512	108	320	320			124	44	104	124	120		
Cricotopus sylvestris grp.			2		12																
Cricotopus/Orthocladius								44	44	28	16	64			96	44	84	104	120		
Limnophyes					4			4	16	8		4									
Nanocladius																					
Parakiefferiella																					
Pseudosmittia								8	8	12					16	4	16	4			
TOTAL ORTHOCLADIINAE	16	4	18	0	28	13.2	11.3	444	580	156	336	388	380.8	155.1	236	92	204	232	240	200.8	62.4
Conchapelopia/Helopelopia				8	4			36	24	20		24			24	56	40	8	60		
Procladius																			4		
TOTAL TANYPODINAE	0	0	0	8	4	2.4	3.6	36	24	20	0	24	20.8	13.1	24	56	40	8	64	38.4	22.9
TOTAL CHIRONOMIDAE	718	62	52	38	116	197.2	292.6	2516	1464	656	592	800	1205.6	810.4	1372	1984	1572	832	1480	1448.0	415.0
OTHER DIPTERA																					
Hemerodromia (dance fly)								4		4			4.0	0.0	4						
Simulium vittatum grp. (black fly)			2	2	4			512	292	1868	984	1448	1020.8	650.3	960	772	680	1664	396	894.4	475.9
TRICHOPTERA (caddisflies)																					
Anabolia								4													
EPHEMEROPTERA (mayflies)																					
Baetidae (damaged)																					
ODONATA																					
Ischnura (damselfly)																		4			
COLEOPTERA (beetles)																					
Agabus (larvae)								4	8										4		
Haliplus (larvae)																4	4				
Peltodytes (larvae)																					
Optioservus fastiditus									4			4				8					
Stenelmis (larvae)								4													
OLIGOCHAETA																					
Naidinae																					
Chaetogaster diastrophus																					
Nais communis																					
Nais variabilis			2																		
Slavina appendiculata																					
Enchytraeidae	6				4				4	4							4				
Megadrili					2												4				
Tubificinae																					
immature tubificids w/o hairs	62	36	26	18	32			1568	88	132	84	52			152	124	88	148	232		
immature tubificids with hairs	18	10	8		8			500	48	12	44	4			412	448	444	456	396		
Limnodrilus cervix																					
Limnodrilus claparedeianus																					
Limnodrilus hoffmeisteri		10		4	2			60	44	24					4	16	12	12	8		
Limnodrilus udekemianus		10		6	6			12	4	4											
Tubifex tubifex		2			4			52	4						248	84	132	16	100		
TOTAL OLIGOCHAETA	86	68	36	28	58	55.2	23.6	2192	192	176	128	56	548.8	920.1	816	672	684	632	736	708.0	70.9
Gastropoda (too immature/damaged)								20	72	8					20	12	12	96			
Gyraulus (snail)																					
Lymnaeidae (too immature/damaged)								436	24		128	56			68	40	100	64	52		
Physa (snail)	8			2				68	36	32	8	16			44	28	60	32	40		
Stagnicola catascopium (snail)								48	12	16		12			36	36	28	28	32		
Valvata																4					
TOTAL MOLLUSCA	8	0	0	2	0	2.0	3.5	572	144	56	136	84	198.4	212.0	168	120	200	220	124	166.4	44.6
Caecidotea racovitzi (sowbug)								8		4	4				4	4	12		8		
Caecidotea sp. (sowbug)																					
Orconectes virilis (crayfish)																	1	1			
Corixidae (nymphs - waterboatman)																		4			
Hydrachnida (mites)																					
Erpobdella (leech)																					
Hydra								60	88	20	52	44			140	124	56	48	112		
TOTAL ORGANISMS	812	130	90	70	178	256.0	313.5	5868	2180	2784	1896	2432	3032.0	1618.7	3464	3676	3205	3405	2856	3321.2	309.5
TAXA RICHNESS	8	9	8	7	14	9.2	2.8	24	22	21	11	16	18.8	5.3	19	20	21	20	17	19.4	1.5

TABLE 3. (continued)

Newton Creek Macroinvertebrates

Numbers per Core or Hess Sample - Raw Data

June 6-7, 2006

Taxon	NC-F (Hess samples)							NC-G (Hess samples)							NC-L (Core samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																					
Chironomus	60	140	60	4	48			32	36	16	236	8			32	16	40	24	72		
Glyptotendipes sp. grp. A	12				4				4	8	8										
Polypedilum			4																		
Polypedilum illinoense grp.																					
TOTAL CHIRONOMINI	72	140	64	4	52	66.4	48.9	32	40	24	244	8	69.6	98.2	32	16	40	24	72	36.8	21.6
Micropsectra	108	140	112	88	92			124	148	44	96	32				2		4			
Paratanytarsus		4	4		8				8			4			2		2				
Tanytarsus				4																	
TOTAL TANYTARSINI	108	144	116	92	100	112.0	20.0	124	156	44	96	36	91.2	51.4	2	2	2	4	0	2.0	1.4
Cricotopus bicinctus grp.	96	56	68	352	416			768	796	488	164	452									
Cricotopus sylvestris grp.	4																		2		
Cricotopus/Orthocladius	28	24	12	100	92			68	76	64	16	60									
Limnophyes	8	4		8	4			4	4												
Nanocladius			4							4											
Parakiefferiella	4																				
Pseudosmittia	24	28	12	16	12			12		4	4	4									
TOTAL ORTHOCLADIINAE	164	112	96	476	524	274.4	208.2	852	876	560	184	516	597.6	283.4	0	0	0	0	2	0.4	0.9
Conchapelopia/Helopelopia	24	4	24	32	20			44	52		12	16									
Procladius	4									4											
TOTAL TANYPODINAE	28	4	24	32	20	21.6	10.8	44	52	4	12	16	25.6	21.1	0	0	0	0	0	0.0	0.0
TOTAL CHIRONOMIDAE	372	400	300	604	696	474.4	167.6	1052	1124	632	536	576	784.0	280.8	34	18	42	28	74	39.2	21.3
OTHER DIPTERA																					
Hemerodromia (dance fly)																					
Simulium vittatum grp. (black fly)	56	72	148	2296	1392	792.8	1012.0	156	104	200	4	912	275.2	363.4							
TRICHOPTERA (caddisflies)																					
Anabolia			4																		
EPHEMEROPTERA (mayflies)																					
Baetidae (damaged)	4																				
ODONATA																					
Ischnura (damselfly)																					
COLEOPTERA (beetles)																					
Agabus (larvae)	4		8																		
Haliplus (larvae)																					
Peltodytes (larvae)								4													
Optioservus fastiditus				28	8							4									
Stenelmis (larvae)				4	4				12												
OLIGOCHAETA																					
Naidinae																					
Chaetogaster diastrophus	4																				
Nais communis	4									4											
Nais variabilis				4											2			2	2		
Slavina appendiculata					4																
Enchytraeidae				8	12							4							2		
Megadrili		4		4																	
Tubificinae																					
immature tubificids w/o hairs	1860	1392	1724	200	840			880	356	656	2528	228			128	10	16	74	44		
immature tubificids with hairs	372	140	172	116	220			632	80	220	732	116			6			4	4		
Limnodrilus cervix															2						
Limnodrilus claparedeianus		12	16					8			28										
Limnodrilus hoffmeisteri	12	36	28	8	8			16	12	4	60	8					2				
Limnodrilus udekemianus	4	4	4					16	12		4	16					2				
Tubifex tubifex	36	56	4	36	32				24	36	232	68									
TOTAL OLIGOCHAETA	2292	1644	1948	376	1116	1475.2	751.1	1552	484	920	3584	440	1396.0	1302.3	138	10	20	80	52	60.0	51.6
Gastropoda (too immature/damaged)	44	100	16	40	56			60	4	92	72	8					6				
Gyraulus (snail)					4																
Lymnaeidae (too immature/damaged)	266	48	48	56	80			476		72	288	52						2	2		
Physa (snail)	80	88	68	8	32			56	12		20										
Stagnicola catascopium (snail)	16	36		12	12			12	24		32	4									
Valvata																					
TOTAL MOLLUSCA	406	272	132	116	184	222.0	119.5	604	40	164	412	64	256.8	243.6	0	0	6	2	2	2.0	2.4
Caecidotea racovitzai (sowbug)	3652	3972	2316	3216	1660			1736	812	788	1428	304									
Caecidotea sp. (sowbug)																	2				
Orconectes virilis (crayfish)	1				2																
Corixidae (nymphs - waterboatmen)																					
Hydrachnida (mites)		4	4	4	4					4	4										
Erpobdella (leech)				4																	
Hydra	80	28	8	64	24			32													
TOTAL ORGANISMS	6863	6392	4860	6680	5078	5974.6	936.4	5132	2564	2708	5968	2296	3733.6	1690.8	172	28	70	110	128	101.6	55.1
TAXA RICHNESS	28	23	24	26	27	25.6	2.1	20	19	18	20	19	19.2	0.8	6	3	7	6	7	5.8	1.6

TABLE 4.

Newton Creek Macroinvertebrates

Numbers per Meter Square - Core or Hess Sample

June 6-7, 2006

Taxon	NC-A (Core samples)							NC-B (Hess samples)							NC-D (Hess samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																					
Chironomus	1322	3086	0	0	0			47	47	47	0	140			140	421	374	140	234		
Glyptotendipes sp. grp. A	20718	3526	1763	0	5730			281	187	561	94	281			47	0	0	47	0		
Polypedilum	0	0	0	0	0			0	0	47	0	0			0	0	0	0	0		
Polypedilum illinoense grp.	0	0	0	0	0			0	0	0	0	47			0	0	0	0	0		
TOTAL CHIRONOMINI	22040	6612	1763	0	5730	7229	8720	327	234	655	94	468	355	216	187	421	374	187	234	281	110
Micropsectra	132681	6171	5730	6612	12783			23474	9820	4957	2899	4068			12812	21042	15150	6733	13514		
Paratanytarsus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Tanytarsus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL TANYTARSINI	132681	6171	5730	6612	12783	32796	55912	23474	9820	4957	2899	4068	9043	8486	12812	21042	15150	6733	13514	13850	5130
Cricotopus bicinctus grp.	3526	882	3526	0	2645			4536	5985	1263	3741	3741			1450	514	1216	1450	1403		
Cricotopus sylvestris grp.	0	0	441	0	2645			0	0	0	0	0			0	0	0	0	0		
Cricotopus/Orthocladius	0	0	0	0	0			514	514	327	187	748			1122	514	982	1216	1403		
Limnophyes	0	0	0	0	882			47	187	94	0	47			0	0	0	0	0		
Nanocladius	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Parakiefferiella	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Pseudosmittia	0	0	0	0	0			94	94	140	0	0			187	47	187	47	0		
TOTAL ORTHOCLADIINAE	3526	882	3967	0	6171	2909	2486	5190	6780	1824	3928	4536	4452	1814	2759	1075	2385	2712	2806	2347	730
Conchapelopia/Helopelopia	0	0	0	1763	882			421	281	234	0	281			281	655	468	94	701		
Procladius	0	0	0	0	0			0	0	0	0	0			0	0	0	0	47		
TOTAL TANYPODINAE	0	0	0	1763	882	529	789	421	281	234	0	281	243	153	281	655	468	94	748	449	268
TOTAL CHIRONOMIDAE	158247	13665	11461	8375	25566	43463	64496	29412	17114	7669	6920	9352	14093	9474	16039	23193	18377	9726	17301	16927	4851
OTHER DIPTERA																					
Hemerodromia (dance fly)	0	0	0	0	0			47	0	47	0	0			47	0	0	0	0		
Simulium vittatum grp. (black fly)	0	0	441	441	882	353	369	5985	3413	21837	11503	16927	11933	7602	11222	9025	7949	19452	4629	10456	5563
TRICHOPTERA								0	0	0	0	0			0	0	0	0	0		
Anabolia	0	0	0	0	0			47	0	0	0	0			0	0	0	0	0		
EPHEMEROPTERA (mayflies)																					
Baetidae (damaged)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
ODONATA																					
Enallagma (damselfly)	0	0	0	0	0			0	0	0	0	0			0	0	0	47	0		
COLEOPTERA (beetles)																					
Agabus (larvae)	0	0	0	0	0			47	94	0	0	0			0	0	0	0	47		
Haliplus (larvae)	0	0	0	0	0			0	0	0	0	0			0	47	47	0	0		
Peltodytes (larvae)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Optioservus fastiditus	0	0	0	0	0			0	47	0	0	47			0	94	0	0	0		
Stenelmis (larvae)	0	0	0	0	0			47	0	0	0	0			0	0	0	0	0		
OLIGOCHAETA																					
Naididae																					
Chaetogaster diastrophus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Nais communis	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Nais variabilis	0	0	441	0	0			0	0	0	0	0			0	0	0	0	0		
Slavina appendiculata	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Enchytraeidae	1322	0	0	0	882			0	47	47	0	0			0	0	47	0	0		
Megadrili	0	0	0	0	441			0	0	0	0	0			0	0	882	0	0		
Tubificidae																					
immature tubificids w/o hairs	13665	7934	5730	3967	7053			18330	1029	1543	982	608			1777	1450	1029	1730	2712		
immature tubificids with hairs	3967	2204	1763	0	1763			5845	561	140	514	47			4816	5237	5190	5331	4629		
Limnodrilus cervix	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus claparedeianus	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus hoffmeisteri	0	2204	0	882	441			701	514	281	0	0			47	187	140	140	94		
Limnodrilus udekemianus	0	2204	0	1322	1322			140	47	47	0	0			0	0	0	0	0		
Tubifex tubifex	0	441	0	0	882			608	47	0	0	0			2899	982	1543	187	1169		
TOTAL OLIGOCHAETA	18954	14987	7934	6171	12783	12166	5203	25624	2244	2057	1496	655	6415	10756	9539	7856	8831	7388	8604	8443	842
Gastropoda (too immature/damaged)	0	0	0	0	0			234	842	94	0	0			234	140	140	1122	0		
Gyraulus (snail)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Lymnaeidae (too immature/damaged)	0	0	0	0	0			5097	281	0	1496	655			795	468	1169	748	608		
Physa (snail)	1763	0	0	441	0			795	421	374	94	187			514	327	701	374	468		
Stagnicola catascopium (snail)	0	0	0	0	0			561	140	187	0	140			421	421	327	327	374		
Valvata	0	0	0	0	0			0	0	0	0	0			0	47	0	0	0		
TOTAL MOLLUSCA	1763	0	0	441	0	441	763	6687	1683	655	1590	982	2319	2478	1964	1403	2338	2572	1450	1945	521
Caecidotea racovitzai (sowbug)	0	0	0	0	0			94	0	47	47	0	37	39	47	47	140	0	94	65	53
Caecidotea sp. (sowbug)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Orconectes virilis (crayfish)	0	0	0	0	0			0	0	0	0	0			0	0	12	12	0		
Corixidae (nymphs - waterboatman)	0	0	0	0	0			0	0	0	0	0			0	0	0	47	0		
Hydrachnida (mites)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Erpobdella (leech)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Hydra	0	0	0	0	0			701	1029	234	608	514			1637	1450	655	561	1309		
TOTAL ORGANISMS	178965	28652	19836	15428	39231	56422	69106	68597	25484	32545	22164	28430	35444	18923	40494	42972	38301	39804	33387	38992	3559
TAXA RICHNESS	8	9	8	7	14	9.2	2.8	24	22	21	11	16	18.8	5.3	19	20	21	20	17	19.4	1.5

TABLE 4. (continued)

Newton Creek Macroinvertebrates

Numbers per Meter Square - Core or Hess Sample

June 6-7, 2006

Taxon	NC-F (Hess samples)							NC-G (Hess samples)							NC-L (Core samples)						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																					
Chironomus	701	1637	701	47	561			374	421	187	2759	94			7053	3526	8816	5290	15869		
Glyptotendipes sp. grp. A	140	0	0	0	47			0	47	94	94	0			0	0	0	0	0		
Polypedilum	0	0	47	0	0			0	0	0	0	0			0	0	0	0	0		
Polypedilum illinoense grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL CHIRONOMINI	842	1637	748	47	608	776	571	374	468	281	2852	94	814	1148	7053	3526	8816	5290	15869	8111	4764
Micropsectra	1263	1637	1309	1029	1075			1450	1730	514	1122	374			0	441	0	882	0		
Paratanytarsus	0	47	47	0	94			0	94	0	0	47			441	0	441	0	0		
Tanytarsus	0	0	0	47	0			0	0	0	0	0			0	0	0	0	0		
TOTAL TANYTARSINI	1263	1683	1356	1075	1169	1309	234	1450	1824	514	1122	421	1066	601	441	441	441	882	0	441	312
Cricotopus bicinctus grp.	1122	655	795	4115	4863			8978	9305	5705	1917	5284			0	0	0	0	0		
Cricotopus sylvestris grp.	47	0	0	0	0			0	0	0	0	0			0	0	0	0	441		
Cricotopus/Orthocladius	327	281	140	1169	1075			795	888	748	187	701			0	0	0	0	0		
Limnophyes	94	47	0	94	47			47	47	0	0	0			0	0	0	0	0		
Nanocladius	0	0	47	0	0			0	0	47	0	0			0	0	0	0	0		
Parakiefferiella	47	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Pseudosmittia	281	327	140	187	140			140	0	47	47	47			0	0	0	0	0		
TOTAL ORTHOCLADIINAE	1917	1309	1122	5564	6126	3208	2433	9960	10240	6546	2151	6032	6986	3313	0	0	0	0	441	88	197
Conchapelopia/Helopelopia	281	47	281	374	234			514	608	0	140	187			0	0	0	0	0		
Procladius	47	0	0	0	0			0	0	47	0	0			0	0	0	0	0		
TOTAL TANYPODINAE	327	47	281	374	234	253	126	514	608	47	140	187	299	247	0	0	0	0	0	0	0
TOTAL CHIRONOMIDAE	4349	4676	3507	7061	8136	5546	1959	12298	13140	7388	6266	6733	9165	3282	7494	3967	9257	6171	16310	8640	4702
OTHER DIPTERA																					
Hemerodromia (dance fly)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Simulium vittatum grp. (black fly)	655	842	1730	26840	16272	9268	11831	1824	1216	2338	47	10661	3217	4248	0	0	0	0	0		
TRICHOPTERA																					
Anabolia	0	0	47	0	0			0	0	0	0	0			0	0	0	0	0		
EPHEMEROPTERA (mayflies)																					
Baetidae (damaged)	47	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
ODONATA																					
Enallagma (damselfly)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
COLEOPTERA (beetles)																					
Agabus (larvae)	47	0	94	0	0			0	0	0	0	0			0	0	0	0	0		
Haliplus (larvae)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Peltodytes (larvae)	0	0	0	0	0			47	0	0	0	0			0	0	0	0	0		
Optioservus fastiditus	0	0	0	327	94			0	0	0	0	47			0	0	0	0	0		
Stenelmis (larvae)	0	0	0	47	47			0	140	0	0	0			0	0	0	0	0		
OLIGOCHAETA																					
Naididae																					
Chaetogaster diastrophus	47	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Nais communis	47	0	0	0	0			0	0	47	0	0			0	0	0	0	0		
Nais variabilis	0	0	0	47	0			0	0	0	0	0			441	0	0	441	441		
Slavina appendiculata	0	0	0	0	47			0	0	0	0	0			0	0	0	0	0		
Enchytraeidae	0	0	0	94	140			0	0	0	0	47			0	0	0	0	441		
Megadrili	0	882	0	882	0			0	0	0	0	0			0	0	0	0	0		
Tubificidae																					
immature tubificids w/o hairs	21743	16272	20154	2338	9820			10287	4162	7669	29552	2665			28211	2204	3526	16310	9698		
immature tubificids with hairs	4349	1637	2011	1356	2572			7388	935	2572	8557	1356			1322	0	0	882	882		
Limnodrilus cervix	0	0	0	0	0			0	0	0	0	0			441	0	0	0	0		
Limnodrilus claparedeianus	0	140	187	0	0			94	0	0	327	0			0	0	0	0	0		
Limnodrilus hoffmeisteri	140	421	327	94	94			187	140	47	701	94			0	0	441	0	0		
Limnodrilus udekemianus	47	47	47	0	0			187	140	0	47	187			0	0	441	0	0		
Tubifex tubifex	421	655	47	421	374			0	281	421	2712	795			0	0	0	0	0		
TOTAL OLIGOCHAETA	26793	20053	22772	5230	13046	17579	8530	18143	5658	10755	41897	5144	16319	15224	30415	2204	4408	17632	11461	13224	11371
Gastropoda (too immature/damaged)	514	1169	187	468	655			701	47	1075	842	94			0	0	1322	0	0		
Gyraulus (snail)	0	0	0	0	47			0	0	0	0	0			0	0	0	0	0		
Lymnaeidae (too immature/damaged)	3110	561	561	655	935			5564	0	842	3367	608			0	0	0	441	441		
Physa (snail)	935	1029	795	94	374			655	140	0	234	0			0	0	0	0	0		
Stagnicola catascopium (snail)	187	421	0	140	140			140	281	0	374	47			0	0	0	0	0		
Valvata	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL MOLLUSCA	4746	3180	1543	1356	2151	2595	1397	7061	468	1917	4816	748	3002	2848	0	0	1322	441	441	441	540
Caecidotea racovitzai (sowbug)	42692	46433	27074	37595	19405	34640	11202	20294	9492	9212	16693	3554	11849	6635	0	0	0	0	0		
Caecidotea sp. (sowbug)	0	0	0	0	0			0	0	0	0	0			0	0	441	0	0	88	197
Orconectes virilis (crayfish)	12	0	0	0	23			0	0	0	0	0			0	0	0	0	0		
Corixidae (nymphs - waterboatman)	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Hydrachnida (mites)	0	47	47	47	47			0	0	47	47	0			0	0	0	0	0		
Erpobdella (leech)	0	0	0	47	0			0	0	0	0	0			0	0	0	0	0		
Hydra	935	327	94	748	281			374	0	0	0	0			0	0	0	0	0		
TOTAL ORGANISMS	80228	75557	56813	78924	59362	70177	11203	59993	29973	31657	69766	26840	43646	19765	37909	6171	15428	24244	28211	22393	12142
TAXA RICHNESS	28	23	24	26	27	25.6	2.1	20	19	18	20	19	19.2	0.8	6	3	7	6	7	5.8	1.6

TABLE 5.

Hog Island Macroinvertebrates
Numbers per Core Sample - Raw Data
June 14-15, 2006

Taxon	Loon's Foot Landing (Reference)							HI-1							HI-10							HI-30						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																												
Chironomus								14	2	8	18	10			2	2	2	2	8			2	4	4	12	2		
Cryptochironomus			2					2																				
Cryptotendipes	8		8	2																								
Dicrotendipes funildus	22	12	4	16	16																							
Endochironomus subtendens grp.																												
Microtendipes pedellus grp.				2																								
Parachironomus			2		2																		2					
Polypedilum halterale grp.	6	2	6	4																								
Stictochironomus				2																								
TOTAL CHIRONOMINI	36	14	22	26	18	23.2	8.4	16	2	8	18	10	10.8	6.4	2	2	2	2	8	3.2	2.7	2	6	4	12	2	5.2	4.1
Cladotanytarsus mancus grp.		4		8	2																							
Micropsectra																							2					
Paratanytarsus	2			10	2																							
Tanytarsus	28	26	24	36	14					2					2			2	2				2	4				
TOTAL TANYTARSINI	30	30	24	54	18	31.2	13.7	0	0	2	0	0	0.4	0.9	2	0	0	2	2	1.2	1.1	0	4	4	0	0	1.6	2.2
Cricotopus sylvestris grp.	2			4																								
Cricotopus/Orthocladius					2																							
Psectrocladius	2	2																										
TOTAL ORTHOCLADIINAE	4	2	0	4	2	2.4	1.7	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0
Procladius		2	2	2												2									2			
TOTAL TANYPODINAE	0	2	2	2	0	1.2	1.1	0	0	0	0	0	0.0	0.0	0	2	0	0	0	0.4	0.9	0	0	0	2	0	0.4	0.9
TOTAL CHIRONOMIDAE	70	48	48	86	38	58.0	19.5	16	2	10	18	10	11.2	6.3	4	4	2	4	10	4.8	3.0	2	10	8	14	2	7.2	5.2
TRICHOPTERA (caddisflies)																												
Oecetis	4																											
OLIGOCHAETA																												
Naididae																												
Arcteonais lomondi	2	2	2	4						2	4	2						2	6									
Chaetogaster diaphanus	4			4																		2						
Dero		2	2	4				2	2	6	6	2				6		6	4				8	6				
Nais bretscheri/pardalis	18	12	12	6	8													2										
Nais communis	2																	4	2									
Nais simplex		2		2	2																							
Nais variabilis	40	76	16	38	72			2								2		6	8			4	4					
Ophidonais serpentina					2																							
Paranais frici																		6	4									
Slavina appendiculata	4	4		4											2													
Specaria josinae																	2											
Stylaria lacustris				2																								
Uncinais uncinata	2			2																								
Vejdovskyella intermedia																4		2	2									
Tubificidae																												
immature tubificids w/o hairs	72	64	32	186	60			6	8	24	32	76			8		2	4	6				12					
immature tubificids with hairs	6	6	2	18	2			8	2	4	20	16					2	6										
Aulodrilus limnobius				2																								
Hyodrilus templetoni				2																								
Limnodrilus cervix										2																		
Limnodrilus claparedeianus					2																							
Limnodrilus hoffmeisteri	4							6		4	2	4																
TOTAL OLIGOCHAETA	152	166	64	270	148	160.0	73.4	24	12	40	60	98	46.8	33.8	10	12	6	36	26	18.0	12.6	6	24	6	0	0	7.2	9.9
Pisidium (clam)	8	10	6	4	8																							
Musculium/Sphaerium (clam)				4																								
Gyraulus (snail)				2																								
Valvata	2																											
TOTAL MOLLUSCA	10	10	6	10	8	8.8	1.8	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0
Caecidotea sp. (sowbug)				4																						2		
Hydrachelda (mites)		2																										
Helobdella stagnalis (leech)					2														2									
TOTAL ORGANISMS	236	226	118	370	196	229.2	91.3	40	14	50	78	108	58.0	36.1	14	16	8	40	38	23.2	14.7	8	34	14	14	4	14.8	11.5
TAXA RICHNESS	20	16	14	27	15	18.4	5.3	7	4	8	6	6	6.2	1.5	4	5	4	11	10	6.8	3.4	3	7	3	2	2	3.4	2.1

TABLE 6.

Hog Island Macroinvertebrates
Numbers per Meter Square - Core Sample
June 14-15, 2006

Taxon	Loon's Foot Landing (Reference)							HI-1							HI-10							HI-30						
Replicate	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD	1	2	3	4	5	Mean	STD
CHIRONOMIDAE																												
Chironomus	0	0	0	0	0			164	23	94	210	117			23	23	23	23	94			441	882	882	2645	441		
Cryptochironomus	0	0	441	0	0			23	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Cryptotendipes	1763	0	1763	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Dicrotendipes fusciclus	4849	2645	882	3526	3526			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Endochironomus subtendens grp.	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Microtendipes pedellus grp.	0	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Parachironomus	0	0	441	0	441			0	0	0	0	0			0	0	0	0	0			0	441	0	0	0		
Polypedilum halterale grp.	1322	441	1322	882	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Stictochironomus	0	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL CHIRONOMINI	7934	3086	4849	5730	3967	5113	1860	187	23	94	210	117	126	75	23	23	23	23	94	37	31	441	1322	882	2645	441	1146	914
Cladotanytarsus mancus grp.	0	882	0	1763	441			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Micropsectra	0	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	441	0	0	0		
Paratanytarsus	441	0	0	2204	441			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Tanytarsus	6171	5730	5290	7934	3086			0	0	23	0	0			23	0	0	23	23			0	441	882	0	0		
TOTAL TANYTARSINI	6612	6612	5290	11902	3967	6876	3016	0	0	23	0	0	5	10	23	0	0	23	23	14	13	0	882	882	0	0	353	483
Cricotopus sylvestris grp.	441	0	0	882	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Cricotopus/Orthocladius	0	0	0	0	441			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Psectrocladius	441	441	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL ORTHOCLADIINAE	882	441	0	882	441	529	369	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Procladius	0	441	441	441	0			0	0	0	0	0			0	23	0	0	0			0	0	0	441	0		
TOTAL TANYPODINAE	0	441	441	441	0	264	241	0	0	0	0	0	0	0	0	23	0	0	0	5	10	0	0	0	441	0	88	197
TOTAL CHIRONOMIDAE	15428	10579	10579	18954	8375	12783	4308	187	23	117	210	117	131	73	47	47	23	47	117	56	35	441	2204	1763	3086	441	1587	1149
TRICHOPTERA								0	0	0	0	0			0	0	0	0	0									
Oecetis	882	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
OLIGOCHAETA																												
Naididae																												
Arcteonais lomondi	441	441	441	882	0			0	0	23	47	23			0	0	0	23	70			0	0	0	0	0		
Chaetogaster diaphanus	882	0	0	882	0			0	0	0	0	0			0	0	0	0	0			441	0	0	0	0		
Dero	0	441	441	882	0			23	23	70	70	23			0	70	0	70	47			0	1763	1322	0	0		
Nais bretscheri/pardalis	3967	2645	2645	1322	1763			0	0	0	0	0			0	0	0	23	0			0	0	0	0	0		
Nais communis	441	0	0	0	0			0	0	0	0	0			0	0	0	47	23			0	0	0	0	0		
Nais simplex	0	441	0	441	441			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Nais variabilis	8816	16750	3526	8375	15869			23	0	0	0	0			0	23	0	70	94			882	882	0	0	0		
Ophidonais serpentina	0	0	0	0	441			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Paranais frici	0	0	0	0	0			0	0	0	0	0			0	0	0	70	47			0	0	0	0	0		
Slavina appendiculata	882	882	0	882	0			0	0	0	0	0			23	0	0	0	0			0	0	0	0	0		
Specaria josinae	0	0	0	0	0			0	0	0	0	0			0	0	23	0	0			0	0	0	0	0		
Stylaria lacustris	0	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Uncinais uncinata	441	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Vejdovskyella intermedia	0	0	0	0	0			0	0	0	0	0			0	47	0	23	23			0	0	0	0	0		
Tubificidae																												
immature tubificids w/o hairs	15869	14106	7053	40994	13224			70	94	281	374	888			94	0	23	47	70			0	2645	0	0	0		
immature tubificids with hairs	1322	1322	441	3967	441			94	23	47	234	187			0	0	23	70	0			0	0	0	0	0		
Aulodrilus limnobius	0	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Ilyodrilus templetoni	0	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus cervix	0	0	0	0	0			0	0	23	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus claparedelanus	0	0	0	0	441			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Limnodrilus hoffmeisteri	882	0	0	0	0			70	0	47	23	47			0	0	0	0	0			0	0	0	0	0		
TOTAL OLIGOCHAETA	33501	36586	14106	59503	32619	35264	16181	281	140	468	701	1146	547	395	117	140	70	421	304	210	147	1322	5290	1322	0	0	1587	2173
Pisidium (clam)	1763	2204	1322	882	1763			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Musculium/Sphaerium (clam)	0	0	0	882	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Gyraulus (snail)	0	0	0	441	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Valvata	441	0	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
TOTAL MOLLUSCA	2204	2204	1322	2204	1763	1940	394	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caecidotea sp. (sowbug)	0	0	0	882	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	441		
Hydrachnida (mites)	0	441	0	0	0			0	0	0	0	0			0	0	0	0	0			0	0	0	0	0		
Helobdella stagnalis (leech)	0	0	0	0	441			0	0	0	0	0			0	0	0	0	23			0	0	0	0	0		
TOTAL ORGANISMS	52014	49810	26007	81548	43198	50516	20124	468	164	585	912	1263	678	422	164	187	94	468	444	271	172	1763	7494	3086	3086	882	3262	2544
TAXA RICHNESS	20	16	14	27	15	18.4	5.3	7	4	8	6	6	6.2	1.5	4	5	4	11	10	6.8	3.4	3	7	3	2	2	3.4	2.1