RESTORATION PLAN

FULL DELIVERY PROJECT TO PROVIDE STREAM RESTORATION
NEUSE RIVER BASIN CATALOGING UNIT- 03020201

LOWELL MILL DAM-LITTLE RIVER WATERSHED
RESTORATION SITE

PREPARED FOR:

ECOSYSTEM ENHANCEMENT PROGRAM
RALEIGH, NORTH CAROLINA

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1.0 INTRODUCTION

Restoration Systems, LLC (RS) proposes to restore sections of the Little River, Little Buffalo Creek, and associated tributaries upstream of the Lowell Mill Dam located in Johnston County, North Carolina (Figure 1, Appendix A). In order to successfully accomplish the goals of the project, RS has enlisted the services of several firms, which provide scientific and engineering expertise. While the restoration plan is substantially the product of EcoScience Corporation (ESC), portions of the document describe efforts undertaken by staff from Backwater Environmental (BE), The Catena Group (TCG), and Milone & MacBroom, Inc. (MMI) of Connecticut. In a few instances, sections of the restoration plan were written by TCG or MMI, or their text was adapted for use in this plan. These contributions will be cited in the appropriate sections of text.

The Lowell Mill Dam-Little River watershed has been identified as a critical restoration resource for stream and aquatic ecosystem restoration within the Upper Coastal Plain Physiographic Province region of the Neuse River Basin (DRTF 2001). This project will result in the removal of the Lowell Mill Dam on the Little River in Johnston County for compensatory stream mitigation use in the Neuse River Basin. The restoration project has been planned and designed according to constructs outlined in Determining Appropriate Compensatory Mitigation Credit for Dam Removal Projects, March 22, 2004 (USACE Public Notice 3/23/04). This guidance was developed by the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Environmental Protection Agency (EPA), N.C. Division of Water Quality (NCDWQ), and the N.C. Wildlife Resource Commission (NCWRC).

The North Carolina Dam Removal Task Force (DRTF), a coalition of federal and state government agencies, recommends large-scale dam removal as an appropriate and desirable form of compensatory stream mitigation. DRTF participants have prioritized dams in North Carolina to identify those dam removal projects that would result in the largest ecological benefit (Appendix B). The Lowell Mill Dam was designated as the highest priority dam for removal in North Carolina (DRTF 2001). The Lowell Mill Dam has been targeted for removal by natural resource coalitions primarily due to migratory fish blockage, limits on the distribution of endangered species, water quality degradation, and its location within the Neuse River watershed. In portions, the Neuse River watershed has been identified as an impaired system by various regulatory agencies and has received numerous water quality initiatives.

1.1 Project Description

The project site includes the Lowell Mill Dam and associated structures situated within the Little River, approximately 0.3 miles south (downstream) of Interstate 95 (Exit 105), between the

towns of Micro and Kenly (Figure 2, Appendix A). For the purposes of this document the dam site, the impoundment, and immediately adjacent areas will be hereafter referred to as the "Site". All proposed construction activities mentioned in this report will occur on-Site, unless specifically mentioned otherwise. The on-Site construction activities will free approximately 36,875 linear feet of the Little River, Little Buffalo Creek and associated tributaries from the impounding impact of the dam. These stream reaches collectively comprise the "Site Impoundment." Once the dam is removed these stream reaches will revert functionally from artificially impounded lentic systems to free-flowing lotic systems. The functional benefit area (FBA) for this dam removal project comprises the upstream watershed, situated in Hydrologic Unit 03020201, which includes approximately 204,920 linear feet (38.8 miles) of main stem channel along the Little River, Buffalo Creek, Little Buffalo Creek, and Long Branch in Johnston County (Figure 3, Appendix A). The FBA begins at Lowell Mill Dam and extends upstream from the dam to include relatively free-flowing (unimpeded) tributaries in the watershed. These river and stream reaches are currently critical restoration opportunities that would benefit migratory fish (anadromous and potamodromous), endangered species, other important aquatic species, and water quality within the region.

The upper boundary of the FBA is located at the first upstream impediment to critical species migration on each of the FBA's tributaries. For the Little River and Buffalo Creek, upstream dams represent the FBA boundary (Atkins Mill Dam and Wendell Lake Dam, respectively, Figure 4, Appendix A). For Little Buffalo Creek and Long Branch, the upstream FBA is designated by the limits of relatively free-flowing, second order or higher flows that represent suitable anadromous fish habitat. The 204,920 linear feet of main stem channels currently impacted by the dam are also augmented by an additional 452,110 linear feet of first and second order perennial tributaries in the watershed (Figure 4, Appendix A and Appendix C).

1.2 Goals and Objectives

The goals of this project are the restoration of impounded reaches of the Little River and affected tributaries to their natural lotic conditions. To demonstrate the achievement of this goal, the affected water bodies will be evaluated for successful reestablishment of several functional attributes, which include a natural flow regime and habitat improvements for aquatic communities that are typical of a coastal plain lotic environment. Specifically, efforts will be made to confirm that anadromous fish species have been restored to their historical spawning grounds and that species favoring lotic habitats, including rare species, are able to re-colonize these restored habitats. In addition, scientific research conducted by the University of North Carolina at Chapel Hill will publish the results of its investigations on how dam removal operations affect ecosystem processes. The specific goals of this project are to:

- **Restore approximately 36,875 linear feet of free-flowing river** and stream channels that are currently inundated under the spillway crest pool elevation of Lowell Mill Dam.

- **Restore the natural flow regime** and corresponding sediment transport relationships.

- **Restore anadromous fish passage**, foraging, and spawning opportunities within an 82-square mile watershed, including 204,920 linear feet of main stem stream and river channels and an additional 452,110 linear feet of first and second order perennial

tributaries in the watershed for a total of 657,030 linear feet of potential expansion of anadromous fish migratory range.

- **Restore rare and endangered species habitat** within rivers and streams currently lost within the crest pool and within the upstream sediment wedge. Fifteen documented, rare and endangered aquatic species will directly benefit from restoration of a connected, free-flowing river, including dwarf-wedge mussel and the only documented population of Tar spinymussel in the Neuse River Basin.

- **Improve water quality and aquatic communities within impaired (303(d)) rivers** and streams degraded by low dissolved oxygen (DO) and accelerated sedimentation. Both causes of water quality impairment can be directly attributed to the dam and stagnant crest pool within the Little River corridor. A minimum of 36,875 feet or river and stream channel will be converted from fine-grained, crest pool substrate into restored, free-flowing streams and rivers supporting more diverse channel substrate habitat including coarse sand, gravel, cobble, and bedrock substrates.

- **Produce significant new academic data** regarding the effects of dam removal on aquatic and terrestrial ecosystems.

- Generate a minimum of **36,875 linear feet of Stream Mitigation Units (SMUs) for use by the Ecosystem Enhancement Program (EEP) to offset impacts to stream in the specific Neuse River hydrologic unit**. Additional SMUs may also be generated for use by EEP, dependent upon results of post-project monitoring programs.

The removal of the Lowell Mill Dam as a large-scale compensatory mitigation project is consistent with state and national regulatory support for environmentally beneficial dam removal. Furthermore, the removal of Lowell Mill Dam is of particular interest because it stands as the most downstream dam on the Little River and will dramatically extend unimpeded flows to the Neuse River estuary. Preceding the efforts to remove the Lowell Mill Dam, several downstream dams have already been removed. The Quaker Neck and Cherry Hospital Dams were removed in 1998, and the Rains Mill Dam was removed in 1999. The Quaker Neck dam removal project received the 2001 Governors Conservationist of the Year award and was widely publicized nationwide for its environmental benefits. Existing support by resource agencies strongly recommends removal of the Lowell Mill Dam as an attractive, flexible alternative to more traditional stream restoration methodologies.

2.0 EXISTING CONDITIONS

2.1 Physical Resources

2.1.1 Physiography and Land Use

Lowell Mill Dam and its associated river and stream reaches are located in the Upper Coastal Plain Physiographic Province of North Carolina within the Neuse River Basin in Hydrologic Unit 03020201. The Lowell Mill Dam site, located in Johnston County, NC, is approximately

2.5 miles southwest of Kenly and approximately 0.3 mile south of the Interstate 95 crossing over the Little River (Figure 4, Appendix A). Annual precipitation within the project vicinity is approximately 48 inches per year with 55 percent occurring between April and September (USDA 1994).

Physiography within the region is characterized by flat topography, broad interstream divides, and low-gradient, highly sinuous stream channels within gently sloping, terraced valleys. Elevations in the project vicinity range from 200 feet MSL along high ridges to 140 feet MSL along major floodplains.

The FBA contains approximately 38.8 miles of streams and river channels along the Little River, Buffalo Creek, Little Buffalo Creek, and Long Branch. Land use within the watershed is highly variable. Major land use categories include agriculture (52 percent), bottomland hardwood forest (28 percent), pine forest (10 percent), and early successional forest (6 percent). The remaining areas consist of pasture, water bodies, and residential areas of varying density, including portions of the towns of Wendell and Zebulon. Agricultural land uses include several chicken farm operations, row crops including corn, tobacco, and soybeans, and cow pasture. As a result of the Raleigh metropolitan area's eastward expansion, higher-density residential areas have steadily encroached into the Little River basin along the Interstate 64 corridor.

The headwaters of the Little River extend to the north to just east of Youngsville in Franklin County, NC, approximately 36 miles north of Lowell Mill Dam. Little Buffalo Creek's headwaters are in Johnston County in the vicinity of Stancils Chapel, approximately 7.5 miles north of the stream's confluence with the Little River. Buffalo Creek's headwaters are in Wake County, just south of Rolesville, approximately 29 miles northwest of its confluence with the Little River. The headwaters of Long Branch are approximately 7 miles northwest of its confluence with the Little River.

2.1.2 Dam and Impoundment

Lowell Mill Dam is a mass concrete gravity dam and spillway located within the Little River channel and across the adjacent river floodplain (Appendix D). The current dam was constructed around 1914. There has been a dam at the current location since at least 1810. Investigations at the State Archives produced a petition demanding that the North Carolina General Assembly move to demolish or modify the dam to allow fish passage due to impacts on the abundant fishery. The dam abutments and spillway measure approximately 210 feet in length and 10 feet in height. At the north bank abutment, the concrete foundation of the powerhouse remains between the end of the spillway and the bedrock contact.

The impoundment has been actively managed and drained periodically over the last several years to temporarily repair (patch) cracks, damage, and degradation to the concrete spillway structure. More recently the impoundment has been managed in a partially drained conditioned by way of the sluice gate along the right impoundment. The impoundment is managed by the landowners due, in part, to high hazard conditions associated with the structure. Two drownings have occurred in the last decade; the most recent in August 2000. Drownings have occurred within the truculent hydraulic jump at the base of the dam and with the sluice gate structure. Due primarily to potential for additional deaths and the inability to obtain proper

liability insurance, river flow will be allowed to pass through the sluice gate at an elevation prescribed by the owner. In addition, the structure has passed the functional life-span (approximately 50 years) for a mass concrete gravity dam by 50-plus years. Without major repairs or replacement, the dam will fail due to the degraded conditions of the outdated spillway structure.

The contributing drainage areas flowing over the Lowell Mill Dam encompasses approximately 215 square miles. The mean annual discharge is estimated at 400 cubic feet per second (cfs) with the 10-year flood exceeding 5,700 cfs. The spillway crest elevation of the dam resides at 130.75 feet above mean sea level (MSL). Prior to the recent drawdown period, the depth of water flowing over the spillway measured greater than 0.4 feet with the crest pool surface elevation behind the dam estimated at between 130.8 feet and 131.2 feet above MSL.

The upstream limit of the impoundment was located in the field based upon interpolation of remote sensing data generated specifically for this project by GeoData Corporation (Figure 5, Appendix A). The GeoData mapping products (hi-resolution mapping) consist of hi-resolution color-infrared, stereoscopic photography (dated January 2005) and 1-foot interval hypsographic contours that were generated from the aerial photography (Figure 6, Appendix A). The hi-resolution mapping was generated and verified using multiple ground control stations, which were further used to calculate water surface elevations throughout the Site Impoundment. Through interpretation of the channel depth from cross-section data collected by ESC, channel bed elevations were tied into the hi-resolution mapping using sub-meter Global Positioning System (GPS) coordinates, and the upstream limits of waters affected by the dam were determined. The upper limits of selected waters were visited, field verified, and photographed to verify these methods of determining the limits of the impoundment. The findings are corroborated by the initial findings of Eddy Engineering (2001) and Federal Emergency Management Agency (FEMA) studies.

Based on these studies, the dam crest pool (taken as 131 feet MSL) extends approximately 27,680 feet up the Little River valley to a bed elevation point approximately 500 linear feet below SR 1934 (Old Beulah Road) and up Little Buffalo Creek along an estimated 8,260 feet of perennial stream channel to a point approximately 500 feet below NC 42. An additional, 935 linear feet of an unnamed tributary to the Little River has also been identified for impacts due to the dam (Figure 2, Appendix A). As a result, the natural flow regime of approximately 36,875 linear feet (7.0 miles) of river and tributary stream channel are impacted by the impounding effects of the Lowell Mill Dam. Given the dynamics of such a river system like the Little River, the crest pool backwater effect may shift further upstream from this elevation at a distance, dependent upon rainfall, temperature, runoff, flow, and sediment loading conditions.

2.1.3 Little River Above and Below Impoundment

Extensive waterborne reconnaissance of the Little River was performed both upstream and downstream of the Site Impoundment to ascertain the reference condition of the Little River in its un-impounded condition. Upstream, the reconnaissance started at the bridge crossing at SR 2130 and terminated at the bridge crossing at SR 1934 (Old Beulah Road) a travel distance of approximately 4.2 river miles. Throughout this reach, a meandering channel with a substrate of primarily sand and small gravel characterizes the Little River. However, the channel bed is

frequently situated on erosion-resistant bedrock. Through this reach, the channel slope averages approximately 0.033 percent, with bank heights that vary from about 5 to 7 feet from base flow stage. An active floodplain is evident on one or both sides of the river. The bank materials consist mostly of cohesive silt and clay that are relatively resistant to erosion. The banks typically have partial to complete mature tree cover that enhances bank stability. Backwater and few ponded areas were observed adjacent to the channel and floodplain in some locations. While the watershed hydrology is influenced by certain aspects of Coastal Plain geology, the stream morphology is more characteristic of that found in the Piedmont (i.e., generally coarser substrate and higher bankfull channel slope).

Downstream, the reconnaissance started at Lowell Mill Dam and terminated at the site of the former Rains Mill dam at SR 2320, a travel distance of approximately 11 river miles. Throughout this reach, a meandering channel with a substrate of primarily sand and small gravel similarly characterizes the Little River. However, exposed bedrock along the banks and river bottom appear more frequently. Additionally, several reaches are characterized as rapids with cobble bed material with scattered small boulders. The channel slope through this reach averages approximately 0.038 percent, with bank heights that vary from about 5 to 6 feet from base flow conditions. Through much of this reach the channel meanders along bluffs that rise to greater than 40 feet above the valley floor. An active floodplain is evident on one or both sides of the river. The river banks typically have partial to complete mature tree cover that enhances bank stability. Very little backwater and ponding were observed adjacent to the channel and floodplain.

2.1.4 Geology and Soils

The Site is located in a geologically complex area near the convergence of the Upper Coastal Plain and Piedmont physiographic provinces of North Carolina. The area is underlain by the Eastern Slate Belt, which is composed of slightly metamorphosed volcanic and sedimentary rocks (Horton Jr. and Zullo [eds.] 1991). Marine sediment of varying depths overlies these rocks. Rocks characteristic of this geologic region include gneiss, schist, phyllite, metagraywacke, siltstone, and mudstone.

Area soils reflect the region's geologic complexity, and include series typically associated with the Coastal Plain and the Piedmont. Major soils associations within the project vicinity include the following (USDA 1994).

Norfolk-Goldsboro-Rains: This soils association occurs along broad interstream divides or on broad ridges. Norfolk, Goldsboro, and Rains series formed in marine sediments. Norfolk soils are well drained, Goldsboro soils are moderately well drained, and Rains soils are poorly drained. Minor soils within this association include the Marlboro, Lynchburg, Faceville, Varina, Cowarts, Wagram, and Gilead series.

Wagram-Blanton-Bonneau: This association is found on wide ridges in uplands and interstream divides. Wagram, Blanton, and Bonneau soils also formed in marine sediments. Each of these series is moderately well drained to well drained. Minor soils within this association include the Uchee, Norfolk, Fuquary, and Autryville series.

Rains-Goldsboro-Lynchburg: This soils association occurs on relatively broad interstream areas that are relatively undissected by streams. Each of these soils formed in marine sediments. Minor soils within this association include the Grantham, Toisnot, and Nahunta series.

Gilead-**Uchee-Bibb**: This soils association consists of nearly level to moderately steep, moderately well drained, well drained, and poorly drained soils that have loamy and sandy surface horizon and clayey and loamy subsoil. They are mainly found on uplands within the Coastal Plain, and formed in marine sediments. Minor soils within this association include the Goldsboro, Nankin, and Norfolk series.

Cecil-Pacolet-Nason: These gently sloping to steep, well drained soils have loamy surface horizons with predominately clay subsoil. They are most commonly encountered along uplands in the Piedmont, and have formed from weathered acid crystalline rocks. Minor soils within this association include Wehadkee, Marlboro, Norfolk, and Appling soils.

Wedowee: This gently sloping to moderately steep, well drained soil has a loamy surface horizon and clayey subsoil. It is typically mapped on uplands in the Piedmont, and formed in weathered acid crystalline rock. Included within this association are Rion, Vance, Wehadkee, Cowarts, and Cecil soils.

Wehadkee-Bibb-Chewacla: These gently sloping, poorly drained and somewhat poorly drained soils occur along floodplains and depressional areas. They typically have loamy surface layers underlain by sandy material, and formed in fluvial sediments. Minor soils included within this association include the poorly drained Chastain, Tomotley, and Roanoke soils.

Altavista-State-Augusta: This soil association includes well drained to somewhat poorly drained soils that formed in fluvial sediments. They are encountered on stream terrace landforms. Included within this association are Wahee, Tarboro, and Roanoke soils.

Leaf-Dogue: These soils are nearly level, moderately well drained to poorly drained, and have loamy surface horizons underlain by clayey subsoil. They formed in clayey fluvial sediments and occur on stream terraces. Included within this association are Rains and Lynchburg soils.

Lakeland: This nearly level to gently sloping, excessively well drained soil formed in marine sediments. It has a sandy surface and subsurface, and is most commonly encountered along high stream terraces and uplands. Minor soils within this association include Autryville and Bibb soils.

2.1.5 Water Resources

2.1.5.1 Waters of the United States

The Lowell Mill Dam impoundment and associated tributaries are all subject to jurisdictional consideration under Section 404 of the Clean Water Act as waters of the United States (33 CFR Section 328.3). The run-of-the-river impoundment may be classified as a lacustrine, limnetic system with an unconsolidated bottom dominated by gravel and sand (L1UB1/2) (Cowardin *et*

al. 1979). Wetlands within the shoreward boundary may be classified as lacustrine, littoral with an unconsolidated bottom dominated by various substrates from cobble-gravel to vegetated (L2US1-5). Both upstream and downstream of the impoundment, the Little River may be classified as riverine, lower perennial with an unconsolidated bottom dominated by gravel and coarse sand (R2UB1/2). It is anticipated that the Site Impoundment will share the R2UB1/2 classification once restored. Little Buffalo Creek, the only major tributary to the Site Impoundment, may be classified as riverine, upper perennial systems with unconsolidated bottoms dominated by sand (R2UB2) upstream of the effects of the dam.

Vegetated wetlands are defined by the presence of three primary criteria: hydric soils, hydrophytic vegetation, and evidence of hydrology at or near the surface for a portion (5 to 12.5 percent) of the growing season (USACE 1987). Numerous palustrine wetland types occur within the Little River (National Wetland Inventory (NWI)-mapping). Palustrine wetlands include those dominated by trees, shrubs and emergents. These wetlands also include small, shallow, permanent and intermittent water bodies as well as the zone of emergent vegetation created by the impoundment. Palustine wetland classifications include

PFO1C: Palustrine, forested, broad-leaved deciduous, seasonally flooded
PFO1F: Palustrine, forested, broad-leaved deciduous, semipermanently flooded
PSS1C: Palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded
PFO4/1A: Palustrine, forested, needle-leaved evergreen/broad-leaved deciduous, temporarily flooded.

A wetland analysis describing the palustrine wetlands within the Little River floodplain, adjacent to the impoundment is summarized in Section 3.6 and provided in full in Appendix E.

2.1.5.2 Best Usage Classifications

The project watershed is situated in Hydrologic Unit 03020201 of the Neuse River Basin. The watershed encompasses a majority of Neuse River Sub-basin 03-04-06 as designated by the NCDWQ (NCDWQ 2005). The Little River is classified as **WS-V NSW** denoting fresh waters used as a source for water supply (Stream Index Number 27-57). **NSW** denotes nutrient sensitive waters that require additional nutrient management due to excessive growth of microscopic and macroscopic vegetation. Buffalo Creek, Little Buffalo Creek, and Long Branch are classified as **C NSW**, denoting tributaries utilized for secondary recreation that also require nutrient management programs (Stream Index Numbers 27-57-16, 27-57-17, 27-57-15) (NCDWQ 2002).

Two Benthic Macroinvertebrate Sampling Stations, one Fish Community Sampling Station, and two Ambient Monitoring Stations are maintained within the watershed by NCDWQ (NCDWQ 2002). The location of these sampling stations and associated water quality classifications are included in Appendix F. The Lowell Mill Dam impoundment exhibits low dissolved oxygen concentrations (< 4mg/L) below the confluence of Little Buffalo Creek and the Little River. In addition, declining fish communities have been documented within the watershed. As a result, the Little River from the confluence with Little Buffalo Creek to a point 4.2 miles upstream of NC 581 is listed as Impaired Waters by NCDWQ. Due to the water quality problems and development pressures on the upper watershed, parts of the Little River

are designated as a Targeted Local Watershed for stream restoration as designated by the N.C. Department of Environment and Natural Resources', EEP, formerly the North Carolina Wetlands Restoration Program (NCWRP).

2.1.5.3 Point Discharge

The National Pollutant Discharge Elimination System (NPDES) program was established by the federal government to regulate point-source discharges to surface waters. The NPDES Permitting and Compliance Programs of North Carolina's Division of Water Quality is responsible for administering the program for the state. There is one listed point source discharger located within the impoundment (NCDWQ 2002). The Town of Kenly Waste Water Treatment Plant (WWTP) maintains a pipe discharge point directly downstream of the CSX railroad bridge (Figure 6-2, Appendix A). Two other permitted NPDES discharge sources are listed for the Little River in Johnston County, a public school near Zebulon and the Town of Princeton WWTP (NCDWQ 2002).

Based on discussion with NPDES staff, dam removal should not impact the discharge point currently located within the impoundment (Eddy Engineering, 2001). In most cases, dam removal would only be an issue if a minimum release were required from a dam upstream of discharge location. The current discharge line may require some modification. Currently, the discharge line has a vertical riser set just above the crest pool elevation and may need to be extended to the new water level (base flow elevation).

2.1.5.4 Clean Water Act Section 303(d) Streams

NCDWQ has assembled a list of impaired water bodies according to the Clean Water Act (Section 303(d)) and 40 CFR 130.7, hereafter referred to as the NC 2004 Section 303(d) list. The list is a comprehensive public accounting of all impaired water bodies. An impaired water body is one that does not meet water quality standards including designated uses, numeric and narrative criteria and anti-degradation requirements defined in 40 CFR 130.7. The standards violation may be due to an individual pollutant, multiple pollutants, or an unknown cause of impairment. The source of impairment could be from point sources, nonpoint sources, and/or atmospheric deposition. Some sources of impairment exist across state lines. North Carolina's methodology is strongly based on aquatic life use support guidelines available in the Section 305(b) guidelines (EPA-841-B-97-002A and -002B). Those streams attaining only Partially Supporting (PS) or Not Supporting (NS) status are listed on the NC 2004 Section 303(d) list. Streams are further categorized into one of six parts within the NC 2004 Section 303(d) list, according to source of impairment and degree of rehabilitation required for the stream to adequately support aquatic life.

The Little River exhibits development pressures, declining fish communities, and associated problems due to primarily low dissolved oxygen, in great part, from Lowell Mill Dam backwater effects and the minor municipal point source located directly below US 301. As a result the Little River is listed as a water body on the State's 303(d) list because of low dissolved oxygen (NCDWQ 2004) (Appendix F). The impaired reach includes approximately 20 miles, extending from the confluence with Little Buffalo Creek to 4.2 miles upstream of NC 581. Within the Site Impoundment approximately 7,800 linear feet (1.5 miles) of the Little River has been listed. This impaired reach has been placed into Category 5 assessment category, according to guidance

from the EPA (EPA 2001). A Category 5 assessment consists of waters that are impaired for one of more designated uses by a pollutant(s) and requires a Total Maximum Daily Load (TMDL). The term pollutant as defined by EPA means, “dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into the water” (NCDWQ 2004).

In addition, Buffalo Creek, located directly above the Site Impoundment, exhibits impaired biological integrity likely due to sedimentation and nutrient inputs associated with agriculture, construction, and potential Lowell Mill Dam backwater effects. As a result, Buffalo Creek has also been listed as a water body on the State’s 303(d) list for impaired biological integrity (Category 6) (NCDWQ 2004) (Appendix F). Buffalo Creek is also a Targeted Local Watershed for stream restoration as designated by EEP (Subbasin 6, Watershed 80050).

2.1.5.5 Summary of Potential Impacts to Water Quality

Removal of Lowell Mill Dam will provide benefits to water quality and aquatic communities within the former impoundment. Gravel, cobble, and bedrock substrates have been buried by sand, silt, and clay sediments within portions of the lake bed and above the crest pool. In addition, altered water chemistry within the deep, stagnant water of the impoundment is not advantageous to some macroinvertebrates and other aquatic species whose presence is typically associated with free-flowing river systems. The reducing environment within lake sediments has also depleted oxygen levels and altered water temperatures within the impoundment relative to reference (free-flowing) conditions. Changes in the distribution of sediment supply and increases in overbank flood frequency have influenced river channel morphology and floodplain wetlands within the impoundment. Slight changes in the hydrology of fringe wetlands (i.e., those wetlands hydrologically influenced by the crest pool) can be expected as a result of dam removal. However, the change in wetland type from open water to a vegetated condition, expected within areas at elevations below the crest pool elevation, should more than offset any potential impacts to wetlands as a result of dam removal (see Section 3.5).

Impacts to water resources within the Site Impoundment may result from activities associated with dam removal. Activities that could occur as a result of dam removal are: fill (concrete) entering the Little River during final removal of the dam; compaction of soils at the dam removal site; uncontrolled release of sediments; and increased potential for release of fuel, oil and hydraulic fluid from construction equipment.

In order to minimize these potential impacts to water resources, Best Management Practices (BMPs) intended to protect surface waters will be strictly enforced during the dam removal phase of the project. BMP’s will include: eliminating uncontrolled release of sediment by a phased approach to dewatering (currently underway); minimizing incidental fill as a result of dam demolition to the greatest extent possible and removing fill material from waters; ripping and scarifying construction staging site soils following construction; briefing and monitoring equipment operators to ensure fuel and hydraulic lines are properly maintained (on high ground) to preclude leakage, and ensuring that problems will be addressed immediately.

2.2 Biotic Resources

This discussion of biotic resources located within the Site Impoundment focuses on aquatic fauna. However, terrestrial organisms such as birds, reptiles, and mammals use the section of the river and will directly benefit from dam removal. The primary monitoring efforts associated with dam removal will focus on migrating fish and benthic macroinvertebrates, but may include other species depending upon interest by academics and resource agencies. This section describes the communities encountered and the potential changes in these communities induced by removal of the Lowell Mill Dam. The composition and distribution of terrestrial flora is mostly influenced by soil, hydrology, and disturbance. The composition and distribution of aquatic fauna throughout the Site Impoundment is reflective of the bathymetry, flow, light penetration, nutrients, and substrate within the impoundment. Terrestrial fauna composition and distribution depend upon both systems.

2.2.1 Plant Communities

Plant communities adjacent to the Site reflect the agriculturally centered economy of the area. Most of the non-wetlands have been converted to cultivated land. The remaining plant communities adjacent to the Site include Coastal Plain Bottomland Hardwood Forest, pine forest, Coastal Plain Levee Forest (brownwater subtype), and Mesic Mixed Hardwood Forest (Coastal Plain subtype). These occur in various successional stages due to periodic timber harvests. Plant community assemblages were described using Classification of the Natural Communities of North Carolina (Schafale and Weakley 1990) as a reference.

Cultivated land - The majority of land use within the project vicinity is farming by cultivation. Cultivated land consists of a changing mosaic of planted and volunteer plant species depending upon the farming techniques employed. For most techniques, bare soil is present for much of the year, one or several crops are present per growing season, and a plant community that represents the first stage of old field succession is usually present at some point in the year. Common crops planted in the area include cotton (*Gossypium* sp.), soybeans (*Glycine max*), and corn (*Zea mays*). Pioneer plant species that can be found growing in fallow fields include sheep sorrel (*Rumex acetosella*), curly dock (*R. crispus*), dog fennel (*Eupatorium capillifolium*), nut sedge (*Cyperus esculentus*), and broom sedge (*Andropogon virginicus*).

Coastal Plain Bottomland Hardwood Forest - The second most abundant plant community, Coastal Plain Bottomland Hardwood Forest, are wetland forests that occur within the floodplain, sloughs, and low terraces of the Little River and its tributaries. Some areas have been logged and resemble a freshwater marsh community that contains many of the shrub and herbaceous species found within the Coastal Plain Bottomland Hardwood Forest. Canopy trees consist of varying abundances of red maple (*Acer rubrum*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), black gum (*Nyssa biflora*), American elm (*Ulmus americana*), slippery elm (*U. rubra*), willow oak (*Quercus phellos*), swamp chestnut oak (*Q. michauxii*), and overcup oak (*Q. lyrata*). Subcanopy trees include ironwood (*Carpinus caroliniana*), hawthorn (*Crataegus* sp.), and young canopy species. Shrubs and vines within this community include winterberry (*Ilex verticillata*), titi (*Cyrilla racemiflora*), highbush blueberry (*Vaccinium corymbosum*), giant cane (*Arundinaria gigantea*), muscadine grape (*Vitis rotundifolia*), greenbrier (*Smilax rotundifolia*), and poison ivy (*Toxicodendron radicans*). Herbaceous species present are lizard

tail (*Saururus cernuus*), *Carex* spp., Asian dayflower (*Murdania kiesak*), and marsh pennywort (*Hydrocotyle umbellata*).

Pine forest – Pine forests are usually planted and managed and are therefore less diverse than natural forest communities. The canopy exclusively consists of loblolly pine (*Pinus taeda*). Depending upon the age, stocking levels, and understory management, subcanopy and shrub vegetation can be nonexistent or form an impassible thicket. Because pine forests can be planted in a wide variety of soil and hydrological conditions, understory vegetation often resembles, or contains elements of, the natural community that would develop if succession were allowed to proceed naturally. Species that may make up the understory include red maple, sweetgum (*Liquidambar styraciflua*), various oaks (*Quercus* spp.) and hickories (*Carya* spp.). Herbaceous species are typically very low in abundance, but include spotted wintergreen (*Chimaphila maculata*), Christmas fern (*Polystichum acrosticoides*), and partridge pea (*Mitchella repens*).

Coastal Plain Levee Forest (Brownwater Subtype) - This community occupies the levees of the Little River and its tributaries. Few, if any, of these forests have been logged. Coastal Plain Levee Forest occurs along a narrow strip of high ground between the banks of the streams and the associated floodplain. Canopy species present include sugarberry (*Celtis laevigata*), sycamore (*Platanus occidentalis*), river birch, red maple, white oak, green ash, and American elm. Tree species growing beneath the canopy include American holly (*Ilex opaca*), hawthorn, and regenerating canopy species. Shrubs and vines present include Chinese privet (*Ligustrum sinense*), winterberry, blackberry (*Rubus* sp.), downy arrow wood (*Viburnum dentatum*), muscadine grape, greenbrier, trumpet creeper (*Campsis radicans*), Japanese honeysuckle (*Lonicera japonica*), and poison ivy. Herbaceous species are not very abundant, possibly due to competition with vines, but include jewel-weed (*Impatiens capensis*) and false stinging nettle (*Boehmeria cylindrica*).

Mesic Mixed Hardwoods (Coastal Plain Subtype) - Mesic Mixed Hardwood Forests are mainly upland forests that occur within the floodplain and high terraces of the Little River and its tributaries. Like the Coastal Plain Bottomland Hardwood Forest, some areas have been logged and resemble an early succession, scrub-shrub habitat. The mesic mixed hardwoods canopy includes red maple, sweetgum, white oak (*Quercus alba*), water oak (*Q. nigra*), willow oak, American elm, and loblolly pine. Subcanopy species present include American holly, hawthorn, and various canopy species. Shrubs and vines present include giant cane, highbush blueberry, spicebush (*Lindera benzoin*), sweetleaf (*Symplocos tinctoria*), muscadine grape, greenbrier, and poison ivy. Herbaceous species are low in abundance, but include netted chain fern (*Woodwardia areolata*), spotted wintergreen, Christmas fern, and violets (*Viola spp.*).

2.2.2 Wildlife

This discussion of wildlife resources considers the existing fauna possibly associated with the terrestrial and aquatic ecosystems within and near the Site. Each plant community, as well as the entire mosaic of communities, is assessed for likely wildlife utilization based upon simplified assessment of food and cover resources.

2.2.2.1 Terrestrial

The adjacent terrestrial plant communities form a mosaic of forest corridors that follow the Little River and its tributaries. The corridors along the Little River range from 2,500 feet wide near US 301 to as little as 150 feet wide near Old Beulah Road (SR 1934). This configuration of mature and early succession forest provides habitat for a variety of terrestrial fauna.

Cultivated land typically provides little habitat for diverse groups of animals, but it does provide some resources to certain wildlife species such as insects, birds, mammals, amphibians and reptiles. Plant eating insects obviously find abundant food resources in cultivated areas but their abundance is often controlled by the farmer through various pest management strategies. Nonetheless, insects provide food for birds such as the killdeer (*Charadrius vociferus*), purple martin (*Progne subis*), eastern bluebird (*Sialis sialis*), eastern meadowlark (*Sturnella magna*), and savannah sparrow (*Passerculus sandwichensis*) in cultivated areas. Mammals that may forage in cultivated fields include white-tail deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), grey fox (*Urocyon cinereoargenteus*), and eastern mole (*Scalopus aquaticus*). Bat species such as big brown bat (*Eptesicus fuscus*) and red bat (*Lasiurus borealis*) may forage over cultivated land and roost in nearby forests. Few amphibians, other than toads, can endure the heat and dry conditions of cultivated land. American toad (*Bufo americanus*) and Fowler's toad (*B. fowleri*) may find habitat resources among cultivated fields. Reptile species are likely to utilize cultivated land for sunning and food resources. The six lined racerunner (*Cnemidophorus sexlineatus*), rat snake (*Elaphe obsoleta*), and eastern hognose snake (*Heterodon platirhinos*) can be found foraging and sunning on cultivated land.

Coastal Plain Bottomland Hardwood Forests provides habitat for a variety of wildlife species. Bird species such as yellow billed cuckoo (*Coccyzus americanus*), Kentucky warbler (*Opornis formosus*), hooded warbler (*Wilsonia citrina*), prothonotary warbler (*Protonotaria citrea*), Acadian flycatcher (*Empidonax virescens*), white-breasted nuthatch (*Sitta carolinensis*), white-throated sparrow (*Zonotrichia albicollis*), American woodcock (*Scolopax minor*), red-shouldered hawk (*Buteo lineatus*), and barred owl (*Strix varia*) exploit food and cover within this community. Raccoon (*Procyon lotor*), opposum (*Didelphis marsupialis*), white-tail deer, grey fox, eastern pipistrel (*Pipistrellus subflavus*) and red bat utilize trees and/or shrubs for cover within this community but forage generally among open and forested uplands, wetlands, and stream habitats. Beaver (*Castor canadensis*) are regularly found in these communities when watercourses are present. These ecosystem engineers can have large impacts on the structure and composition of plant and animal communities over time. Reptiles and amphibians that utilize this habitat include broadhead skink (*Eumeces laticeps*), northern black racer (*Coluber constrictor*), upland chorus frog (*Pseudacris triseriata*), and gray treefrog (*Hyla chrysoscelis*).

Pine forests typically contain a low diversity of faunal species but may be important for some pine specialists such as brown-headed nuthatch (*Sitta pusilla*) and pine warbler (*Dendroica pinus*). Other bird species that may utilize pine forests for food or cover include downy woodpecker (*Picoides pubescens*), great-crested flycatcher (*Myiarchus crinitus*), blue-gray gnatcatcher (*Polioptila caerulea*), Carolina chickadee (*Poecile carolinensis*), tufted titmouse (*Baeolophus bicolor*), and Carolina wren (*Thryothorus ludovicianus*). Mammal species such as white-tail deer, raccoon, opossum, and gray squirrel (*Sciurus carolinensis*) can often find marginal food and cover resources in pine forests depending on management techniques.

Reptile and amphibians, which may be present, include eastern fence lizard (*Sceloporus undulatus*), Carolina anole (*Anolis carolinensis*), rat snake, gray treefrog, Fowler's toad, and American toad.

Coastal Plain Levee Forest and Mesic Mixed Hardwoods Forests often contain many of the same floristic and hydrologic characteristics that provide similar habitat for much of the same fauna. However, the proximity of Coastal Plain Levee Forests to watercourses increases wildlife use of this community. Bird species found in these forests include summer tanager (*Piranga olivacea*), great-crested flycatcher, Kentucky warbler, northern parula (*Parula americana*), yellow-throated warbler (*Dendroica dominica*), American redstart (*Setophaga ruticilla*, only along larger watercourses), Carolina chickadee, tufted titmouse, and yellow-billed cuckoo. Mammal species such as gray squirrel, raccoon, opposum, mink (*Mustela vison*), shorttail shrew (*Blarina brevicauda*), nutria (*Myocastor coypus*), and muskrat (*Ondatra zibethica*) may utilize portions of these forests for food and shelter. Again, beaver can greatly affect this plant community if present. Reptiles and amphibians that may exploit these forests include box turtle (*Terrapene carolina*), green anole, rat snake, copperhead (*Agkistrodon contortrix*), slimy salamander (*Plethodon cylindraceus*), gray treefrog, and southern chorus frog (*Pseudacris nigrita*).

2.2.2.2 Aquatic

Aquatic insects found in a lentic community provide an indication of the aquatic habitats available within the current system. Low flow conditions and seasonally low dissolved oxygen affect the resident community structure of the Site Impoundment. In addition, nutrient rich water that stagnates behind the dam facilitates algal blooms that can further deplete dissolved oxygen levels at night and contribute to environmental stress to aquatic communities.

The most intolerant orders of aquatic insects are the mayflies (Order Ephemeroptera), caddisflies (Order Trichoptera), and stoneflies (Order Plecoptera) (known collectively as "EPT"). Individual genera within each of these orders vary with respect to specific habitat requirements, but organisms can be grouped by feeding guilds. Feeding guilds are functional feeding groups that include grazers, shredders, gatherers, filter-feeders, and predators, all of which appear to live in the same habitat. The filter-feeder, grazer, and shredder guilds are anticipated to be less dominant or absent in the Site Impoundment than in natural reaches of the Little River due to low dissolved oxygen and decomposing vegetative debris. Seasonal stratification of temperature within the Site Impoundment can result in reduced dissolved oxygen levels below the area of light penetration thereby inhibiting decomposition of organic material. Once the dam is removed and lotic habitats are restored, EPT diversity should increase.

Aquatic birds that may be found in and around the Site Impoundment include belted kingfisher (*Ceryle alcyon*), great blue heron (*Ardea herodias*), and green heron (*Butorides virescens*). Some aquatic or semi-aquatic mammals such as mink, muskrat, and beaver may be common in the channel of the Little River and its tributaries. Aquatic reptiles and amphibians that may be present include redbelly watersnake (*Nerodia erythrogaster*), cottonmouth (*Agkistrodon piscivorous*), eastern painted turtle (*Chrysemys picta*), yellow bellied slider (*Trachemys scripta*), eastern mud turtle (*Kinosternon subrubrum*), and common musk turtle (*Sternotherus odoratus*). Fishes that may be present in the Little River and associated tributaries include redfin pickerel

(*Esox americanus*), bluehead chub (*Nocomis leptocephalus*), swallotail shiner (*Notropis procne*), white shiner (*N. albeolus*), yellow bullhead (*Ictalurus natalis*), margined madtom (*Noturus insignis*), eastern mosquitofish (*Gambusia holbrooki*), bluespotted sunfish (*Enneacanthus gloriosus*), redbreast sunfish (*Lepomis auritis*), and largemouth bass (*Micropterus salmoides*). A host of diadromous fish species (including anadromous species) either currently inhabit portions of or have inhabited the Little River in the past, prior to dam construction. A discussion of fish life histories and anadromous fish species is provided in the next section (Section 2.3.3).

2.2.3 Anadromous Fish

2.2.3.1 Background

Numerous fish species inhabit the Neuse River Basin that may, at various stages in their life history, come into contact with Lowell Mill Dam. These species may range in size from a few centimeters to several feet and display a wide array of behaviors and life histories. Some species complete their life cycles within relatively tight boundaries of freshwater rivers and streams, while others move long distance within a river systems, and still others move between marine and freshwater systems.

Fish that spend their entire lives in freshwaters are referred to as **riverine**. This group includes most of the fish found in our rivers and streams including sunfish, catfish, minnows, suckers, perch, gar and numerous others. The term resident and non-migratory are often applied to this group, however this can be misinterpreted to imply that these fish do not engage in biologically significant movement.

Some of the riverine fish may exhibit spawning migrations from lakes to rivers or from one river to another. This riverine migratory pattern is referred to as **potamodromy**. Some relevant species of fish that engage in potamodromy migration include shorthead redhorse (*Moxostoma macrolepidotum*), V-lip redhorse (*M. pappillosum*), black jumprock (*Scartomyzon cervinus),* and gizzard shad (*Dorosoma cepedianum*).

Certain fish species exhibit specialized migratory patterns that involve seasonal movements between fresh and marine waters. This migratory pattern is called **diadromy**, and comes in three different forms.

The first form includes fish that makes seasonal movements between estuaries and freshwater rivers and streams. This migratory pattern is called **amphidromy**. This form of migration does not occur in fish that would inhabit the Little River.

The second form includes species where sexually mature adults migrate from freshwater rivers and streams to the ocean to spawn. This migratory pattern is called **catadromy**. The only notable species that makes catadromous migration within the Little River is the American eel.

The third form includes fish that hatch in freshwater, migrate to the ocean, from which sexually mature adults migrate back to freshwater rivers to spawn. This migratory pattern is called **anadromy**. Examples of fish that follow anadromous migratory patterns include numerous

relevant species including American shad, hickory shad, Atlantic sturgeon, alewife, sea lamprey, lest brook lamprey, striped bass, and bluejack herring.

2.2.3.2 Anadromous Fish Passage

Removal of this dam will provide functional benefit to an 82-square mile watershed. Within the watershed, 204,920 feet (38.8 miles) of main stem channel and 452,110 linear feet of first and second order perennial tributaries will become available as spawning habitat for 6 species of migratory fish. In addition, fifteen (15) rare and endangered species will also benefit from restoration of a connected, free-flowing river within the region. These species have been documented below the Lowell Mill Dam but have been extirpated upstream of the structure and within the Site Impoundment. This project will complement and expand upon three other dam removal projects in the Neuse and Little Rivers (Quaker Neck Dam Removal, Cherry Hospital Dam Removal, and Rains Dam Removal) that restored access to 1000 miles, 54 miles, and 49 miles of anadromous fish spawning and endangered species habitat, respectively.

The following section describes eight anadromous fish species that will directly benefit from the removal of the Lowell Mill dam and restoration of a free-flowing river within the Neuse River Basin.

American Shad (*Alosa sapidissima*)

The American shad is the largest herring in North America, commonly reaching a size of 4 to 6 pounds. It is both recreationally, commercially, and historically important. A mature female may produce between 100 and 600 thousand eggs per spawn and most spawning occurs in larger tributaries. However, shad populations have sustained dramatic declines due to obstruction by dams (Rulifson 1994). American shad catches have plummeted from more than 8 million pounds in 1896 to 205 thousand pounds in 1995, exhibiting a 98 percent decrease in catch population between 1896 and 1960 (Walburg and Nichols 1967). At one time, North Carolina produced more American shad than any other state on the east coast (Smith 1907). Historically, the Neuse River watershed, including the 44 miles of tributary above Lowell Mill Dam, produced more American shad than any other river system in North Carolina. Radio-telemetry studies and observations of spawning activity have shown that American shad primarily spawn in relatively shallow waters, containing larger substrate such as gravel, cobble, and bedrock. This type of habitat with relatively high gradient, with rocky riffle sections are largely found upstream of the Interstate 95 corridor and not very common in reaches below the Lowell Mill Dam. American shad spawning migrations currently stop at the foot of the Lowell Mill Dam; large migrations are expected to occur through the restored river reach the first spring after dam removal.

Recent studies suggest that each shad, at some point during its lifetime, visits the extent of its migratory range (McPhee 2002). This migratory route extends to the Bay of Fundy in Nova Scotia, Canada. Immeasurable functional benefit to the shad's migratory ecosystem will extend within this range as a result of this project.

Hickory Shad (*Alosa mediocris*)

Hickory shad are a popular recreational species and are the first anadromous species to migrate into the Little River in February and early March (at the lowest water temperatures).

Historically, hickory shad spawned in flooded swamps and the sloughs of small streams throughout the 82-square mile FBA. However, the species and its effects on the ecosystem have been extirpated above Lowell Mill Dam (personal communication Mike Wicker, USFWS 2005). Upon arrival in the small tributaries, the female may produce between 100 and 400 thousand eggs per spawn. Subsequently, the egg and/or larval stages drift downstream until they gain mobility and develop into juvenile shad. The juvenile shad remain in these small tributaries and migrate to the ocean as adults. After returning from Nova Scotia, adult shad will return to spawn above the former dam site at between 2 and 5 years of age (Batsavage 1997).

Alewife (*Alosa pseudoharengus*)

Alewife is a commercially important species that spawns in slow-flowing, shallow streams as well as in the main stem river reaches. Alewife and American shad were among the first fish to be exploited commercially in North Carolina because their oily flesh allowed them to be salt preserved without ice or refrigeration. Due to dams such as Lowell Mill, the species is forced to spawn in the same reach as blueback herring creating competition detrimental to alewife populations (Burdick and Hightower 2005). Lowell Mill Dam likely extirpated 82-square miles of habitat for the species and also caused population declines due to disruption in migratory behavior (e.g. competition at the foot of the dam).

Blueback Herring (*Alosa aestivalis*)

Similar to the alewife, the blueback herring support important commercial and recreational fisheries throughout its range. The blueback herring and alewife are of similar shape and general appearance, and distinguishing between them is difficult, and commercial catches refer to a combination of both species. The fisheries for both these species have declined dramatically from historic highs. The blueback herring spends the greater part of its life in saltwater and returns to fresh water to spawn. It usually spawns later in the spring than the alewife, when water temperatures are a bit warmer. Typical spawning habitat for blueback herring includes dense vegetation or high concentrations of woody debris (Christie 1978). Spawning was observed in both small swift moving creeks and slower, shallow moving waters (Loesch 1987, Christie 1978). During spawning, many eggs are deposited over the stream bottom where they stick to gravel, stones, logs, or other objects (Christie 1978, Loesch and Lund 1977). A few surviving spent fish move back to the sea after spawning. Young fish usually move to sea when about one month old and 1.5 to 2 inches.

Atlantic Sturgeon (*Acipenser oxyrhynchus*)

The Atlantic sturgeon historically occurred in the Neuse and Little River, and formed the basis of an important commercial fishery. The Atlantic sturgeon is classified as threatened by the State of North Carolina. Sturgeon can live up to 60 years, reach a length of 14 feet, and weigh up to 800 pounds. The sturgeon is a primitive looking fish; modern relicts of an ancient group. The eggs of the sturgeon are called caviar, sold as a delicacy, and the average female can carry between 1 million to 2.5 million eggs. Historically, sturgeon is expected to have inhabited sections of the Little River channel. Dams built for navigational control, flood control, and for hydropower on larger coastal rivers have prevented sturgeon from reaching their traditional spawning grounds. The sturgeon spends most of the year in brackish or salt water and moves into area tributaries in January-February to spawn. The Atlantic sturgeon feeds on invertebrates (shrimp, worms, etc.) and stems and leaves of macrophytes.

Striped Bass (*Morone saxatilis*)
The striped bass is a very important fish, both recreationally and commercially. A mature four pound female may produce around 500 thousand eggs per spawn while a 50 pound female will produce up to 5 million eggs per spawn. Striped bass spawn in coastal rivers and tributaries and require adequate distance of river because the developing eggs travel downstream suspended by currents as they develop. Eggs reaching non-flowing water prior to hatching will sink to the bottom and die. Adults return to spawn in their natal river at three to six years of age. Once an abundant and commercially important and sport fish, it has been in serious decline in recent years. Dam removal and re-opening of spawning habitat represents one component of a management plan designed to re-establish viable populations of this species.

Sea Lamprey (*Petromyzon marinus*)
The sea lamprey has received an undeserving bad reputation because of its inadvertent introduction into the Great Lakes and the resultant massive depredation of local species. A native of the Atlantic Ocean the sea lamprey inhabits the coastlines from Labrador to the Gulf of Mexico and Florida, as well as, the Atlantic coast of Europe and Mediterranean Sea. The sea lamprey is an eel-like aquatic vertebrate that grows to an average length of eighteen inches. These jawless creatures have suction mouths with sharp teeth enabling them to feed on large fish. The sea lamprey is generally marine but ascends freshwater rivers to spawn. Once common along the Atlantic Coast, the sea lamprey has declined, due in part because of efforts to eradicate it and because the depletion of its major host species. The sea lamprey has been placed on the freshwater list prioritized for conservation by the North Carolina Wildlife Resource Commission.

Least Brook Lamprey (*Lamptetra aepuptera*)
The least brook lamprey occurs widely along the eastern United States. Within North Carolina, the least brook lamprey is only known in the Neuse River basin. The least brook lamprey is a non-parasitic fish less than five inches in length, which occurs in warm, slow, sandy, and slightly acid small streams (Rohde 1994). The blind larvae (ammocoete) occur in spring-fed wetlands and quiet pools and backwaters of small, sandy or muddy bottom streams. The species is listed as State threatened and has a North Carolina Natural Heritage Program (NHP) State rank of S2 indicating that it is imperiled in North Carolina because of rarity of because of some factor(s) making it vulnerable to extirpation.

2.2.4 Unique Natural Areas

The NHP has designated the entire Little River from Moore's Pond in Franklin County to the confluence with the Neuse River in Wayne County as a Significant Natural Heritage Area (SNHA) (NHP 2005). The Little River Aquatic Habitat area has been given a significance rating of "A". This rating means the area is nationally significant and contains examples of natural communities, rare plant or animal populations, or geologic features that are among the highest quality or best of their kind in the nation, or clusters of such elements that are among the best in the nation. This designation does not confer protection or regulatory status.

2.2.5 Protected Species

2.2.5.1 Federally Listed

Species with federal classification of Endangered (E) or Threatened (T) or officially Proposed for such listing are protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.). The status of "Endangered" refers to "any species, which is in danger of extinction throughout all of a significant portion of its range"; the status of "Threatened" refers to "any species, which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. 1532).

This project will also restore habitat for federally listed endangered species in Johnston County, including the dwarf-wedge mussel (*Alasmidonta heterodon*) and the Tar spinymussel (*Elliptio steinstansana*) (USFWS 2005b). Populations of both species have been documented upstream of the dam impoundment. Recent sampling efforts sponsored by RS have documented the fourth element occurrence of the Tar spineymussel in the vicinity of the SR 2127 crossing upstream of the impoundment (Tim Savidge, TCG; personal communication). These species require flowing water that has been lost within the 36,875 feet (7.0 miles) of the impoundment of Lowell Mill Dam. Removal of the dam will also allow repopulation and genetic exchange as well as migration by endangered species along 38.8 miles of the Little River, Buffalo Creek, Little Buffalo Creek, and Long Branch.

Dwarf-Wedge Mussel (*Alasmidonta heterodon*)

The dwarf-wedge mussel is relatively small, usually brown or yellowish brown in color, with faint green rays that are most noticeable in young specimens. The mussel reproduces by releasing glochidia that attach to the gills or fins of specific host fish. It appears that release of glochidia occurs primarily in April in North Carolina (Michaelson and Neves 1995).

The presence of the correct host fish is also crucial to the dwarf-wedge mussel. Studies suggest that a host may be an anadromous fish, as listed above, which must migrate from the ocean into freshwater to spawn. Damming has not only altered the streambed above Lowell Mill Dam, but may also prevent the host fish from reaching the mussel larvae. Without the host fish, the dwarf-wedge mussel cannot complete its life cycle, and extirpation over the influence of the dam is inevitable. In addition, dwarf-wedge mussel has very specific habitat requirements. It needs a stable, silt-free stream bed and well-oxygenated water. These habitat requirements have been eliminated from 7.0 miles of the Little River and Little Buffalo Creek due to Site Impoundment.

Tar Spinymussel (*Elliptio steinstansana*)

The Tar spinymussel, one of only three freshwater mussels in the world with spines, is a medium-sized mussel, reaching about 2.5 inches in length. In the Neuse River Basin, the only documented population of this species occurs in the Little River Sub-basin in Johnston County. In young specimens, the shell's outer surface (periostracum) is an orange-brown color with greenish rays; adults are darker with inconspicuous rays. Juveniles may have as many as 12 spines; however, adult specimens tend to lose their spines as they mature. Females become gravid in late May to early June, and glochidia are released by the end of June.

The Tar spinymussel lives in relatively silt-free uncompacted gravel and/or course sand in fast-flowing, well oxygenated stream reaches. Stream banks are stable with extensive root systems holding soils in place. The associated landscape is largely wooded, especially near streams. Trees near the stream are relatively mature and tend to form a closed canopy over smaller streams, creeks, and headwater river habitats. The Site Impoundment has eliminated 4.4 miles of this habitat. Dam removal is expected to directly benefit the only documented existence of this species in the Neuse River basin.

2.2.5.2 Federal Species of Concern

Six Federal Species of Concern (FSC) are listed by the USFWS for Johnston County that may benefit from the removal of Lowell Mill Dam (USFWS 2005). FSC are not afforded federal protection under the ESA of 1973, as amended, and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. An FSC is defined as a species that is under consideration for listing for which there is insufficient information to support listing. Table 1 below summarizes FSCs listed for Johnston County likely to benefit by this dam removal project. A review of NHP records indicates that several FSC species have been identified in locations directly upstream and downstream of the impoundment including the yellow lampmussel (*Lampsilis cariosa*), pinewoods shiner (*Lythrurus matutinus*.), Atlanitic pigtoe (*Fusconaia masoni*), Yellow lance (*Elliptio lanceolata*), and "Neuse" madtom (Noturus furiosus) (NHP 2005). Information on distribution, seasonal cycles, and habitat requirements has been collected from the NHP.

Table 1. Federal Species of Concern.

Common Name	Scientific Name	Major Group
"Neuse " Madtom	*Noturus furiosus* pop 1	Fish
Pinewoods Shiner	*Lythrurus matutinus*.	Fish
Atlantic Pigtoe	*Fusconaia masoni*	Mollusk
Green Floater	*Lasmigona subviridis*	Mollusk
Yellow Lampmussel	*Lampsilis cariosa*	Mollusk
Yellow Lance	*Elliptio lanceolata*	Mollusk

2.2.5.3 State Listed

Species with the North Carolina status of Endangered, Threatened are afforded protection under the North Carolina Endangered Species Act (G.S. 113-331 *et seq.*) and the North Carolina Plant Protection Act of 1979 (G.S. 106-202.12 *et seq*.), as amended. A review of NHP records indicates that numerous state listed species that have been identified within or in locations directly upstream and downstream of the impoundment (NCNHP 2005) (Table 2). Information on distribution, seasonal cycles, and habitat requirements has been collected from the NHP. This information will be used for dam removal planning and scheduling purposes, to ensure that temporary impacts to rare species are minimized during construction phases of this project.

Removal of the dam will increase and improve available habitat and will result in enhanced and increased genetic exchange throughout the range of all the above-listed species. In addition,

the North Carolina Wildlife Resources Commission's Non-Game Program considered dam removal projects along the Little River as essential for the long-term survival and health of rare and endangered mussel species (USFWS 2005). The National park Service (NPS) is also considering designating the Little River in Johnston and Wayne Counties a Partnership Wild and Scenic River. A letter from the Neuse River Foundations to the Johnston County Commissioners in support of the Project is provided in Appendix G.

Table 2. North Carolina Listed Aquatic Species.

Common Name	Scientific Name	Major Group	State Status
Least Brook Lamprey	*Lampetra aepyptera*	Fish	T
Carolina Madtom	*Noturus furiosus*	Fish	SC (PT)
Neuse River Waterdog	*Necturus lewisi*	Amphibian	SC
Dwarf-Wedge Mussel	*Alasmidonta heterodon*	Mollusk	E
Triangle Floater	*Alasmidonta undulata*	Mollusk	T
Yellow Lance	*Elliptio lanceolata*	Mollusk	E
Cape Fear Spike	*Elliptio marsupiobesa*	Mollusk	SC
Roanoke Slabshell	*Elliptio roanokensis*	Mollusk	T
Tar Spinymussel	*Elliptio steinstansana*	Mollusk	E
Atlantic Pigtoe	*Fusconaia masoni*	Mollusk	E
Yellow Lampmussel	*Lampsilis cariosa*	Mollusk	E
Eastern Lampmussel	*Lampsilis radiata radiata*	Mollusk	T
Green Floater	*Lasmigona subviridis*	Mollusk	E
Creeper	*Strophitus undulatus*	Mollusk	T
Notched Rainbow	*Villosa constricta*	Mollusk	SC

E—Endangered

T—Threatened

SC—Special Concern

P—Proposed

2.3 Human Resources

2.3.1 Historic and Cultural Resources

Based upon a review of United States Geological Survey (USGS) quadrangle sheets at the State Historic Preservation Office (SHPO, February 20, 2004), the removal of the Lowell Mill Dam is not expected to impact any known historic or archaeological resource (see Appendix H for SHPO correspondence). There has been a dam at the current location since at least 1810. The current dam was constructed around 1914 and supported a grist mill, a common facility within the Fall Line region of North Carolina. There are no remaining structures associated with the former mill except the foundation of the power house, the degrading spillway and sluice gates (see Appendix D). Human habitation and archaeological resources may exist on convex upland ridges near the dam site and river corridor. However, no land disturbing activities are currently proposed within these areas that may affect cultural resources.

2.3.2 Public Recreational Usage

RS has entered into an agreement with Johnston County in the form of an endowment and the commitment to provide certain site improvements to transform the land parcel adjacent to the Lowell Mill Dam into the first county park (Figure 7, Appendix A; also see newspaper accounts, Appendix I). Discussions with the county are underway. RS has engaged the services of a landscape architect to develop a basic park concept and these plans will be discussed with county officials in the near future. Such a public use facility will provide a source of permanent public access to the Little River for fishing, canoeing, kayaking, and general river recreation (Figure 6-4, Appendix A). Encouraging fishing for the newly restored migratory fish route in the Little River, such as shad and herring is a high priority and goal of the site. The proposed park boundary includes approximately 16.5 acres of riparian buffer and river floodplain and approximately 3,000 linear feet of river frontage (Appendix I). RS proposes to provide basic site preparations before permanent ownership and management of the parcel would be assumed by the county. MMI has been contracted by RS to provide a comprehensive park plan for the parcel surrounding the Lowell Mill Dam site. The following text description was provided by Ken Kloeber, P.E. (Senior Project Manager, MMI):

Figure 7 (Appendix A) shows schematically the amenities proposed for the new park. Post and rope fencing will announce and demarcate the entrance to the park from Lowell Mill Road. It will also be used to demarcate the western limit of the public land.

A proposed parking area will accommodate approximately 22 vehicles, and a canoe, kayak, and small boat launch site will be located directly downstream of the current dam location. The pathway to the launch will be stabilized and demarcated by a post and rope fence to limit foot traffic to areas improved for that purpose. The launch at waters edge will be constructed for the best and easiest access for canoes and small boats. No road will be provided for trailers to back to the waters edge—all access will be for car-top and other small boats that can be carried to the launch.

The southern park boundary will be demarcated by a landscaped berm, constructed from the fill removed from the river as part of the dam removal. The berm will be landscaped using native landscape materials, and designed to be relatively maintenance-free.

Interpretive signage is planned to focus on the Lowell Mill Dam, its history and removal, and the importance of the structure in Johnston County history. Approximately 90 feet of the Lowell Mill Dam will remain intact on the north side of the Little River. It is envisioned that the interpretive signage will depict the dam as it existed and was historically operated, and will reference and provide a location key to the remaining segment of the dam. The remains would be keyed into a rendering or photograph of the entire structure. The interpretive kiosk will also discuss the removal plan, the demolition methods and techniques used and, most importantly, the ecological benefits that the removal will bring to the Little River.

The park will, for the most part, remain in its natural state as far as topography and improvements—meaning that the physical intrusion on the land will be minimized in so far as practical. Passive walking and wildlife viewing trails will wind along the south bank of the Little River, with occasional walking access to the waters edge for fishing.

Site improvement activities will include clearing and grading access to the river, installing rope-and-post fencing, interpretive signs, picnic tables, and possibly a gravel access and parking lot. In turn, Johnston County will be obligated to make the site a permanent public access point to the Little River and manage the site in keeping with other public access properties.

3.0 REFERENCE STUDIES

3.1 Preliminary Findings Report

Eddy Engineering, P.C was contracted by RS to conduct a preliminary findings report to evaluate numerous project feasibility and permitting issues including:

1. **Discussion of relevant regulatory agency review:** Agencies potentially involved with project implementation and permitting were catalogued and preliminary permitting and other requirements for each were discussed.
2. **General site observations:** The apparent maximum upstream extent of the dam crest pool was estimated at 4.5 miles upstream of the dam location, which accorded with available FEMA FIS stream invert data for the Little River.
3. **Preliminary sediment characterization:** Preliminary engineering surveys indicated that there did not appear to be a large volume of sediment within the impounded reaches of the Little River, indicating that channel velocities were sufficient to maintain adequate sediment transport throughout the impounded system.
4. **Preliminary hydraulic analyses:** Preliminary analyses indicated no change in the base flood elevations upon dam removal relative to existing conditions. However, additional cross-sectional survey information would be required to refine flood elevation estimates after the dam is removed.

The Preliminary Findings Report, Lowell Dam Removal (Eddy Engineering, P.C., 2001) can be found in Appendix J.

3.2 Channel Morphology and Sedimentation

3.2.1 Overflow Dam Hydraulics and Geomorphic Effects on a River Channel

Overflow dams result in upstream and downstream changes in a river channel. Upstream from the dams a backwater pool is created, the depth and extent of which depends on the height of the individual dam and the slope of the channel. Within this backwater reach of the river, the decrease in flow velocity may result in some deposition of material on the channel bed. Conversely, as water flows over the dam its velocity and erosive power increases. The potential consequences of these effects include increased channel bed and bank erosion immediately downstream from the dam as the river expends the extra energy. Most of the erosion occurs during high flows when the river's erosive power is greatest. Bed erosion may create a plunge pool at the base of the dam, with the formation of companion depositional bars just downstream as the river loses its ability to transport the scoured bed load. The depositional bars may divert the flow toward or away from the banks. Bank erosion results in channel widening and also may contribute to the formation of the depositional bars. The form and downstream extent of

these effects vary from site to site as affected by human-caused and natural conditions that may either promote or inhibit the river's response to the overflow dams.

3.2.2 Channel Geomorphology

Permanent channel cross-sections have been established at 23 locations through the Site Impoundment, on tributaries where functional restoration is expected to occur, and on reference reaches to facilitate an evaluation of the project's channel stability following dam removal. Figure 8 (Appendix A) depicts the locations of each permanent monitoring location. All cross-sections were measured from rebar monuments placed outside of the channel and located with Trimble® GPS technology that has reported sub-meter accuracy. From the rebar monument, a cross-section of the channel is measured by stretching a graduated tape across the channel and measuring elevations with a laser level (vertical measurement).

3.2.3 Sediment Retention and Particle Size Analysis

Sediment transport and deposition is a natural stream process. The construction of dams alters the sediment transport dynamics within the system. Dams trap sediment that enters the crest pool because the stream power that transports particles is halted temporarily. Sedimentation in storage reservoirs follows a typical pattern. Coarse sediments such as gravel and course sands drop out from stream flow that enters the reservoir backwater or headwaters, creating a delta accumulation. Smaller particles, such as silts, are transported further into the pool area before they drop out. The resulting deposits therefore consist of silt layers on the pool floor in the middle portion of the impoundment. The finest clay sediments are suspended in the water and slowly settle out throughout the impoundment, including areas at the upstream face of the dam.

Unlike reservoir impoundments, run-of-river impoundments (e.g. Lowell Mill Dam impoundment) appear to provide velocities high enough to cause scour and self-armoring (i.e., fluvial processes in which fine materials are eroded away leaving an erosion-resistant substrate that resists both surface and internal erosion), particularly in the reach closest to the dam. Run-of-river impoundments have a level pool only during low flow periods. Water surface profiles analysis confirmed "relatively" high velocities in the reach upstream of the dam (Eddy Engineering, P.C., 2001). More recently, flow modeling done by MMI have provided stage and velocity data for existing and future, no dam conditions. The preliminary results indicate only very modest increases in velocities from the removal of the dam (Ken Kloeber, personal communication).

From preliminary sediment evaluations (Eddy Engineering, P.C., 2001), channel cross-section surveys (Section 3.2.2), and waterborne reconnaissance there generally does not appear to be large volumes of sediment retained within the main channel, below crest pool elevation. These studies have confirmed that the bed elevations at the dam and for several hundred feet upstream are at approximately the same elevation as bed elevations directly below the dam. However, while large volumes of sediment are not retained within the impoundment, uncharacteristic depositional areas including large transverse bars and aggradation of the bed were observed within the impoundment, particularly within the upper reaches of the Little River. While the volumes of sediments appear to be relatively small, the shallow layer of fine sediment that is present throughout much of the Site Impoundment may have a dramatic effect on aquatic habitat.

These depositional areas and the potential changes in substrate classification are being monitored through temporal cross-sectional data, particle size analyses, and by photo documentation from permanently established vantage points.

3.3 Sediment Collection and Analyses

The USFWS agreed to provide expertise in developing protocols for sampling and analyzing the sediments from the impoundment and from areas upstream and downstream. Tom Augspurger, a noted environmental toxicologist on the staff of the USFWS has managed sediment sample collections from the river bed in the Little River. These sediment sampling protocols have been designed by Augspurger and were approved by resource agencies to screen for toxic materials that may be hazardous to the river ecosystem if mobilized through removal of the dam. The sediments are being analyzed, and if toxic compounds are identified, then a plan for removal or remediation will be implemented prior to Site Impoundment dewatering. The following Tier 2 sediment collection and analyses methodology was adapted from text provided by Tom Augspurger:

Sample locations

Based on the small size of the impoundment and the sand and gravel sediment characteristics, five sites within the impounded reach were sampled (Figure 8, Appendix A). Sampling targeted the few depositional areas where any contamination would be highest (e.g. adjacent to northeast bank behind the dam, and the quiescent area on the north bank near the confluence with Little Buffalo Creek) as a worst case scenario. These quiescent areas are where fine-grained sediments (which have the greatest potential to accumulate contaminants) are most likely to settle. Also sampled were areas downstream of the few potential pollutant source areas including the “battery site”, a location of discarded batteries immediately downstream of the CSX railroad crossing; the Kenly wastewater treatment plant pipe discharge point; and downstream of the Interstate-95 crossing.

Sediment Sample Collection

Samples were collected April 14, 2005 between 1100 and 1700. At Sites 1, 2, 3 and 4, a stainless-steel petite Ponar dredge was used to collect the top 5 to 10 cm of sediment; multiple grabs were collected and composited to form one sample at each site. At Site 5, a stainless-steel mud auger was used to take the samples for that site. The composite of the grab samples was homogenized by stirring with a stainless-steel spoon in a stainless-steel bucket. Debris (e.g., sticks, leaves, rocks bigger than ~0.1 cm^3) were removed during homogenization. Collection equipment was thoroughly cleaned (ambient water rinse, detergent and water scrub, distilled / demineralized water rinse, 10 percent nitric acid rinse, distilled / demineralized water rinse, hexanes rinse, and a final rinse with distilled / demineralized water) before sampling each site. Aliquots of the homogenate were put into jars provided by the analytical lab. An aliquat was also put into a 4-L container in the event that additional testing (tier 3) is conducted. Samples were stored in a cooler on ice (~ 4 ^oC) in the field and upon reaching the Service Lab in Raleigh until they were delivered to the analytical lab on April 15, 2005 at 1205.

All samples were collected, transported and stored under chain of custody. Sediment chemistry results were obtained within 2 to 4 weeks of sampling so that a decision on any additional

testing (e.g., tier 3 toxicity testing) could be made within the holding times for the archived sample.

Sediment Chemical Analyses

The sediment samples are being analyzed for elemental contaminants by inductively coupled plasma mass spectrometry (ICP-MS), inductively coupled plasma atomic emission spectrometry (ICP-AES) and cold vapor atomic absorption (CVAA) and for polycyclic aromatic hydrocarbons by gas chromatography and high performance liquid chromatography. These analyses will address the components of highway run-off as well as the batteries. Sediment particle sizes will be determined by sieve series, and percent organic carbon (volatile organic solids) determined by loss on ignition. Particle size and organic carbon help with interpretation of the other chemistry data. Analyses will be accompanied by batch-specific quality control / quality assurance samples (blanks, duplicates, standard reference material). Tritest, Inc. of Raleigh, NC is performing the analyses. Tritest, Inc. has the North Carolina Laboratory Certification for all of the analyses.

3.4 Pre-Project Comprehensive Aquatic Surveys

TCG was contracted by RS to provide a comprehensive aquatic survey for pre-dam removal conditions within the impoundment and in reference areas above and below the impoundment. The following sampling procedures for mussels and fish surveys are adapted from text provided by Tim Savidge (Principal Investigator, TCG). Several rare mussels, fish and other lotic aquatic species documented from the Little River (Tables 1 and 2, Section 2.2.5) could benefit from restoration of these reaches to pre-impoundment conditions. These include the federally Endangered dwarf-wedge mussel, which has been recorded at several locations in the Little River upstream of the crest pool, and the Tar spinymussel, which has been found approximately 7.5 miles upstream and 6 miles downstream of Lowell Mill Dam, respectively.

The success criteria established by the USFWS and the goals of RS for restoration of lotic habitats recommends that the composition of the aquatic fauna currently present within the project area be established and then monitored for change in composition after the dam is removed. Therefore, documenting such a change involves two phases:

1. Pre-dam removal surveys in order to establish a qualitative baseline of aquatic species (mussel, macro-snail, Neuse River waterdog and fish) present in the impounded reaches and nearby free-flowing reaches of the Little River and Little Buffalo Creek.

2. Monitoring the restored reaches for anticipated change in mussel, macro-snail, Neuse River waterdog and fish composition as a result of restoration for a five-year period.

Survey protocols developed for this effort will follow methods accepted by the scientific community for each of the target species. Voucher specimens of non-listed species may be collected at each survey location. Specimens will be deposited in the North Carolina Museum of Natural Sciences (NCMNS).

3.4.1 Survey Locations

Prior to removal of the dam, surveys for aquatic species (mussels, snails, Neuse River waterdog and fish) will be completed at 8 sites within the Site Impoundment on the Little River, as well as 2 sites upstream and 3 sites downstream of the Site Impoundment on the Little River. The sites selected outside of the crest pool will serve as target community reference reaches, and may also help in determining direction (upstream vs. downstream) of recruitment into the restored reaches after dam removal. The planned survey locations by water body and general survey site location relative to the Site Impoundment are listed in Table 3 and shown on Figures 8 and 9 (Appendix A).

Table 3. Designated Aquatic Species Survey Locations.

Waterbody	Survey Locations	Approximate Reach Length (m)
Little River (upstream of crest pool)	SR 2130, SR 2127	200 (each)
Little River (within crest pool)	16, 15, 12, 10, 7, 4, 3, 1 (Corresponding RS Survey Locations)	200 (each)
Little River (downstream of crest pool)	SR 1001, SR 2320, SR 1002	200 (each)

The exact locations of the survey reaches will be determined in the field and based on the best potential habitat observed for the target aquatic species at each survey location. Survey sites within the crest pool are spaced fairly evenly throughout the impounded reach in order to get a representation of habitat conditions within the impacted area. These sites will be selected to correspond with physical habitat and benthic macroinvertabrate stations previously established by ESC investigators.

Survey stations outside (upstream and downstream) of the Site Impoundment will be selected to achieve an accurate representation of in-stream habitat outside of the impact area (crest pool). The general locations of these sites will be selected based on accessibility (road crossings), and proximity to the impacted reach. The specific survey locations will be sited such that they avoid any apparent impacts from road crossing structures or adjacent land-use. All of the pre-removal survey stations will then be established as permanent monitoring stations for future monitoring.

Mussel Surveys

Comprehensive survey efforts at each of the locations listed in Tables 1 and 2 are needed to accurately evaluate the presence, species composition, and relative abundance of freshwater mussel species occurring at each of the survey reaches. The purpose of these surveys is to qualitatively document the freshwater mussel community in the impounded reaches of the Little River, and compare the community to areas within the watershed that are not influenced by the effects of the dam. Surveys of the impounded reaches will utilize SCUBA. A four-person survey team will be used (2 divers, 1 surface support, and 1 in shallow habitats using Mask/snorkle). In each survey reach, mussel surveys will begin at the downstream limit of the survey reach and proceed upstream. Timed searches will be employed in various sections of

the survey reach in order to provide catch per unit effort (CPUE) data. The locations of the timed surveys will be determined in the field and will be based on existing habitat conditions.

All appropriate habitat types will be searched thoroughly via visual surveys using glass bottom buckets (bathyscopes) and/or mask/snorkel in the shallow water habitats and SCUBA in the deep water sites. All species of freshwater bivalves will be recorded, photographed and returned to the substrate. Those monitored by the NCNHP will be measured and checked for evidence of reproduction. Any federally listed species found during the survey efforts, will be located using GPS and each individual returned to where it was found. RS, USFWS, and NCWRC will be contacted of the findings.

Snail Surveys

Snail surveys will be conducted in conjunction with the mussel surveys using similar methodology. Snails will be hand picked from rocks and woody debris, and dip nets will be used to sift through leaf packs. At the end of each timed search, the snails will be identified to species and each species assigned a relative abundance rating to correspond to the section of the identified survey reach.

Neuse River Waterdog Surveys

The Neuse River water dog is an aquatic salamander endemic to the Neuse and Tar-Pamlico River Basins of North Carolina that has become increasingly rare in recent years. Surveys for this secretive species will be conducted concurrently with the mussel surveys, by turning over rocks and other cover objects in the water.

3.4.2 Fish Surveys

Qualitative fish surveys targeting the shallow water lotic species will be conducted in the defined unimpounded survey reaches. Following the mussel survey, fish surveys will be conducted in the defined survey reach. Fish surveys will employ a combination of electrofishing and seine netting methods. Electrofishing will not occur at a particular site if federally listed freshwater mussel species are found during the mussel surveys.

Electrofishing Method

Surveys for the identified target fish species will be conducted at the 13 survey locations listed in Table 3 and shown on Figures 8 and 9. As with mussel surveys, all of the habitat types present in the survey reach will be sampled at least once. Fish surveys will be conducted by a 4-person survey team, with two persons operating backpack electroshocker units, and dipnets and two people positioned with a seine net approximately 3 meters downstream of the shocking unit to catch any displaced fish missed by the dip net. Riffle and run habitats will be sampled in this manner moving upstream at 3-4 meter intervals until the entire length of riffle/run is sampled. This process will be performed in the middle of the channel and close to each bank, in order to traverse the entire habitat. Pools will be sampled using backpack shockers and dipnets.

All captured fish will be placed into a water bucket until they are identified, counted, and released. The time at which the fish was identified, counted and released, will depend on the

number of fish in the bucket and the condition of the fish. Fish that do not recover from the electroshocking will be preserved in 95 percent ethanol.

Seine Netting Method

Seine netting is an effective method in shallow riffles and runs, as well as shallow pools. This method is not as effective in deeper pools or riffles with a very strong current. Timed searches will be employed in various sections of the survey reach in order to provide CPUE data. The locations of the timed surveys within the survey reach will be determined in the field and based on existing habitat conditions.

Each habitat type in a given survey reach will be sampled at least once by a 3-person team. Seine hauls will be performed by dragging the net upstream through the riffle/run. Pools will be sampled by the team making fast pulls in a downstream direction and herding fish towards the banks, and/or sand/gravel bars. All captured fish will be placed into a water bucket until they can be identified and counted.

If the any federally-listed species are found during the survey efforts, the exact location will be recorded using GPS and individuals returned to the collection site.

Other methods

Hand-held dipnets and visual surveys (mask/snorkel, SCUBA) will also be used to document the fish community present at each survey location. One of the target fish species, the Carolina madtom is very elusive, hiding under rocks, logs and other objects, during the daytime, coming out to forage at night. In addition to the fish capturing methods described above, searches for the Carolina madtom will be conducted by carefully turning over cover objects while conducting mussel surveys.

3.5 Benthic MacroInvertebrates

Pre-project benthic macroinvertebrate sampling was performed in June 2004 by ESC biologists. Monitoring locations were established within, up-, and down-stream portions of the Site Impoundment (see Figures 8 and 9, Appendix A). It is anticipated that post-removal collections may move slightly from the pre-removal conditions in order to take advantage of developing habitat niches (i.e., riffles) that cannot be predicted pre-removal. Collection techniques will depend upon the depth of water in the river since the impounded conditions are very different from reference conditions. Benthic macroinvertebrate samples have been collected from individual reaches using the Qual-4 collection method (NCDWQ 2003). Sampling techniques of the Qual-4 collection method consist of kick nets, sweep nets, leaf packs, and visual searches. For deepwater habitats, dredge samples were collected as a surrogate to the kick net method. Fine mesh samplers and sand samples were also performed based on habitat specifics of individual sites. Collection procedures will be available for review by NCDWQ biologists. Pre-project biological sampling occurred during the month of June 2004, with post-project monitoring planned for the spring of each subsequent monitoring year.

Identification of collected organisms was performed by Pennington & Associates, Inc. which is a NCDWQ certified laboratory. A reference organism collection will be maintained by ESC and

will be available for taxonomic review. Additional data collected will include D50 sediment values and appropriate NCDWQ habitat assessment forms.

3.6 Adjacent Wetlands Study

Due to anticipated base level changes along the Little River and Little Buffalo Creek as a result of the dam removal, it is reasonable to ask whether the anticipated changes in water surface elevations in the Little River and Little Buffalo Creek might affect adjacent wetlands. In order to assess the potential effects of a base level drawdown, the Little Buffalo Creek riparian wetland system was studied and compared with a geomorphologically similar reference riparian wetland system at the confluence of Buffalo Creek and the Little River. Within each system, valley transect surveys, plant community descriptions, landform descriptions, photographic documentation, and detailed soil profile descriptions were completed. The entire wetland study, Lowell Mill Dam Wetland Study (ESC 2005) is provided in Appendix E.

The objectives of the study were to 1) compare and contrast the physical and biological attributes of the study wetland system (Little Buffalo Creek) and reference wetland system (Buffalo Creek); 2) catalogue anticipated changes in the study wetland system as a result of local river base level drawdown; and 3) compare the acreage of open water areas outside the Little River channel directly influenced by the dam crest pool (i.e., those areas at or below 131 feet MSL) to the acreage of upland areas potentially given jurisdictional wetland hydrology as a result of the impoundment to determine whether or not a net loss of wetland areas can be expected as a result of the dam removal.

Similar landforms were observed at both the Little Buffalo Creek and Buffalo Creek wetland areas, including a natural levee immediately adjacent to the Little River, a backwater slough area, the Little River floodplain, which doubled as a terrace for the major tributary at each wetland site, each tributary floodplain, and a low terrace observed adjacent to the tributary terrace at the Little Buffalo Creek study wetland. The relative elevations associated with each of these features were generally consistent at each site.

Hand auger borings indicated similar soil properties between each wetland area. The areas evaluated within each wetland are mapped Wehadkee loam (USDA 1994). Soil borings performed in the backwater slough areas adjacent to Little Buffalo Creek confirmed the Wehadkee series, while borings performed in the levee and Little River floodplain/tributary terrace landforms better resembled the Altavista series. Soil borings taken within the Buffalo Creek floodplain also confirmed the Wehadkee series. Although soil borings were not taken within the Little Buffalo Creek floodplain due to inundated conditions, soils within this landform are expected to resemble the Wedhadkee series with a veneer of sediment overlaying the typical soil profile.

Plant communities contrasted considerably between the two wetland areas. Although the Little River levee communities at both sites were similar, sparse vegetation characterized the Little Buffalo Creek floodplain, while diverse hardwoods and shrubs were observed within the Buffalo Creek floodplain. The major factor accounting for this dissimilarity is the hydrologic conditions present at each wetland. Due to near permanent flooded conditions within portions of the Little Buffalo Creek study wetland, vegetative strata are undeveloped, while the frequent

flooding/drying out of the Buffalo Creek reference wetland has enabled a variety of species with a range of tolerances for various hydrologic regimes to thrive.

Although inundated areas within the Little Buffalo Creek floodplain indicate potential influence from the dam crest pool, field observation and data collected for the purposes of this study suggest that rather than a loss of wetland area, changes in hydrologic regime, plant community structure, and wetland function are anticipated for the Little Buffalo Creek wetland area. These changes are expected to shift the edaphic and biotic conditions present at the Little Buffalo Creek wetland towards conditions characteristic of the Buffalo Creek reference wetland. Benefits not realized with the sparsely vegetated, open water areas present at the Little Buffalo Creek wetland relative to the bottomland hardwood forest wetlands characteristic of the Buffalo Creek include enhanced primary productivity, greater biodiversity, and a wider variety of beneficial biogeochemical processes.

3.7 Academic Study of Dam Removal Impacts

With the assistance of the USFWS, RS has sponsored ongoing academic monitoring and investigation of the environmental and ecological effects of removing the Lowell Mill Dam. Mr. Adam Riggsbee, a Ph.D. Candidate (Department of Environmental Science, UNC-Chapel Hill) is studying the environmental impacts of removing the Lowell Mill Dam. His study is entitled Floodplain Wetland and Channel Biogeochemical Relationships Following Dam Removal on the Little River in North Carolina and will experimentally investigate hydrologic, geomorphic and ecological links in streams. In particular, the study will investigate the influence of floodplain wetland plant succession on channel biogeochemistry and floodplain nutrient retentive capacity (FNRC). The following abstract provided by Mr. Riggsbee summaries his research effort.

> FNRC is defined as the ability of the floodplain to attenuate surface water inorganic nutrient concentrations during spates. Following dam removal, altered hydraulics drive upstream channel adjustment exposing nutrient-rich sediments for floodplain succession. Particular emphasis will be focused on the fate of interstitial nutrients within the developing floodplain wetland and floodplain community succession. Initial data show interstitial water N, P and C concentrations 50-400X greater than channel and wetland surface waters. N leaching to the channel from the floodplain has been observed supporting the hypothesis that the floodplain is a nutrient source during the early stages of secondary succession. Secondary succession is measured using macrophyte biomass (AFDM) and within the rooting-zone using fungal biomass (ergosterol method) and bacterial productivity (^{14}C-leucine method). Nutrient data from the floodplain and along the impounded reach are being collected throughout the dam removal/successional process (surface water, interstitial and sediment surface). In addition to the field studies, development of FNRC is being investigated using greenhouse mesocosms under variable hydrologic conditions in the presence and absence of wetland floodplain vegetation along a biomass gradient.

RS may enlist other academic partners in the project with the consent of the EEP. The research will provide the EEP, RS, academic workers elsewhere in the country, and regulatory agencies

nationwide with significant new data to assess the effects of dam removal on ecosystems and watersheds.

4.0 DAM REMOVAL PROTOCOL

Dam removal protocols have been developed pursuant to State and Federal regulatory requirements and in keeping with multi-agency dam removal guidance. The removal of the Lowell Mill Dam consists of four primary components. These include 1) critical species surveys (around the dam Site only), 2) phased sediment management through impoundment dewatering, 3) dam removal, and 4) dam site stabilization. MMI has been contracted by RS to provide comprehensive engineering services and expertise for the removal Lowell Mill Dam. The following procedures for impoundment dewatering, dam removal methods, and dam site stabilization procedures have been adapted from text provided by Ken Kloeber, P.E. (Senior Project Manager, MMI).

4.1 Species Surveys (Dam Site)

Aquatic mussel surveys will be performed within the river bed for a distance of 800 feet below the dam site prior to demolition activities. Surveys will focus on the potential for presence of dwarf-wedge mussel, Tar spinymussel, Atlantic pigtoe, yellow lance, yellow lampmussel, green floater, triangle floater, notched rainbow, and creeper (all rare and endangered mussels). Populations will be identified and habitat areas delineated in the field using GPS.

4.2 Dewatering and Phased Sediment Management

The impoundment above the Lowell Mill Dam currently exists in a partially dewatered state. On March 30 and May 25, 2004, and May 10, 2005, RS augmented capacity through the power house. This was done in order to begin normalized sediment transport from the upper reaches of the Site Impoundment through the system, to mitigate high-hazard conditions at the Dam site, and to allow riparian recruitment to the channel banks within the upper reaches river.

The 2004 action was accomplished by removing two of four gates from the water room structure, removing a steel plate obstructing passage through the downstream side of the water room, and cutting concrete from the water room exit walls in order to increase cross-sectional area to increase flow capacity.

In the spring of 2005, in a final effort to increase flow through the obstruction prior to permitted dam removal activities, RS removed the remaining head gates and dislodged an obstruction blocking the draft tube for the former left-hand turbine. During normal summer flow, the discharge of the Little River can now drain through the Mill's water room, down through the draft tube and mill structure, and exits the mill tailrace to the river channel below the dam. No water currently passes over the spillway, but rather passes entirely through the powerhouse.

Sediment retention studies and channel surveys suggest relatively little sediment has been retained behind Lowell Mill Dam. Throughout a majority of the reach, exposed rock is visible on one or both banks, including the area surrounding the dam. Within 300 feet of the dam, the impoundment bottom (through the historic channel section) is rocky and at the same elevation upstream and downstream of the dam. This indicates that flow velocities are high enough to

cause scour and self-armoring of the stream near the dam. Water profile analyses and comparison to FEMA studies of the river also confirm relatively high velocities within the local reach upstream of the dam. Passive channel reformation is well underway with limited observed turbidity (Adam Riggsbee, personal communication).

Dewatering of dams in advance of demolition is often necessary by "notching" the dam, which involves removing a small section of dam (the notch). This results in a breach in the upper portion of the dam structure, which released water from the upper portions of the impounded water column. Once the impoundment water level has fallen to the new invert elevation established by the notch, the notch can be enlarged and elevation lowered to bleed off more of the impounded water.

Where gates and other water control devices are present, phased dewatering can be effectively accomplished without the need to notch the dam. That is the approach taken at the Lowell Mill Dam.

4.3 Dam Removal and Restoration Methods

The Lowell Mill Dam is a concrete mass structure that may be supported directly on bedrock. There are bedrock outcrops at the dam location, and this suggests that the dam may have been constructed on a rock ledge, which was historically commonplace. The structures at the site consist of the 190-foot-long dam proper, a headwall abutment at its north end, and the foundation of the old mill structure at the south end of the dam. The mill structure acts as the dam headwall at that end.

The mill foundation consists of the head structure that housed the trash racks and head gates, two water rooms, and turbine draft holes leading to the exit race to the Little River. No internal mechanical works currently exist in the structure. Walls at the former mill are exposed and show remains of reinforcing bar, and MMI expects that the dam and north headwall/abutment is also reinforced concrete. The mill structure currently holds back the earthen/bedrock embankment at the south side of the dam.

The first task in demolishing the dam is to lower the remaining impoundment level as far as possible. This will be accomplished by removing selected sections of the mill structure to allow a higher capacity flow. The downstream wall and sections of the floor of the water rooms will be removed, which will allow substantially greater flow through the structure (currently the only flow path is through the turbine draft tube at the floor of the north water room, and is limited to the hydraulics of orifice flow though the opening.

Once the impoundment has been lowered to the extent possible, the dam will be removed from the south side, working toward the north side. While working in that sequence it may be necessary to divert the river flow through the mill structure using one or more temporary water dams, which is ecologically preferable to using temporary fill to construct a diversion or cofferdam.

Figure 10 shows where construction access will be established for the dam demolition. Primary access will be from the south via Bagley Road and Lowell Mill Road. Construction staging will

be directly adjacent to the dam site, with primary access to the river being immediately below the dam. There, the river bank grade is shallower that at, or above the dam, and less manipulation of the topography will be necessary — which will lessen the potential for impact due to erosion and siltation. A stabilized construction entrance will be constructed as part of the erosion and sediment controls to minimize silt discharge to the Little River.

A secondary access from the north is available, and would be used in circumstances where the dam must be approached that side. It is anticipated that all work can be done from the primary access due the expected low flow in the river. Nevertheless, the secondary access is provided if, for instance, flow is elevated due to rain and equipment or materials must be removed from the river. In such and event, equipment could be moved and temporarily staged on the north bank and accessed via the route shown on Figure 10.

After the initial segment of dam is removed, river flow will be diverted to that area while the floor and most of the mill structure is demolished. The concrete walls at the southern limit of the structure will be retained to act as a temporary revetment to hold back the earthen embankment (its current function). Once the majority of the mill structure is removed, river flow will be directed back to that location and away from the dam demolition area. The reason for sequentially removing a portion of the dam and then the mill structure is to avoid having flow in the immediate area of dam demolition. This reduces the opportunity for demolition debris to be swept downstream by the river flow and it partially diverts the hydraulics away from the dam.

It is anticipated that the concrete mass dam is steel-reinforced, and demolition will be by a combination of means, including diamond-wire cutting, backhoe-mounted hydraulic hammers, and possibly very low-level blasting. The blasting option would be selected based on a survey of the dam by a licensed blasting firm prior to finalization of demolition plans. The purpose would be not to demolish the dam into fragments, but to provide internal cracking through controlled drilling, charge size, and placement and timing so that the dam can be demolished in appropriate sized segments. This is preferable to creating a rubble pile and a high amount of smaller-sized pieces that could be transported downstream if a rain event occurs during demolition.

4.4 Dam Site Stabilization

The north-side channel bank above the dam consists of alluvial material that MMI believes was deposited over the dam's long history. Experience in dam removal projects indicates that approximately half the alluvial area would eventually be eroded by the Little River after natural velocities are restored through the river corridor at the dam site. RS chose a proactive approach to this, and will remove the alluvial sediment to avoid impacts that might occur over time as material is carried downstream during flood events. Figure 11 shows the area proposed to be removed by excavating to the existing Little River channel bottom elevation, and subsequently reestablishing the south bank profile.

Approximately two-thirds of the dam will be completely removed, leaving one-third permanently in place (Figure 11). The in-place portion will serve as a revetment to prevent potential erosion of the alluvial deposits. Concrete waste and rubble from the southern two-thirds will be placed by excavator in the cavity behind the remaining on-third on the northern bank. Soil excavated

from the alluvial bank immediately upstream of the dam wall will be used to fill voids in and around the newly placed concrete rubble within the cavity. When the grade of the filled cavity reaches approximately one-foot below the crest of the dam, the area will be compacted to a final elevation. The downstream side of the dam will remain mostly visible as a reminder of the dam's history, in keeping with the interpretive signs of various historic and ecological explanation planned at the new county park.

In addition to using concrete waste material as fill within the north bank cavity, material will be placed to armor the north bank immediately below the dam where there has been bank erosion and undermining of mature tree roots. Soil from excavation of the alluvium above the dam would also be used here to fill and grade this area, as well as used in the planned county park to create vegetated berms along its southern property line.

Finally, those portions of the mill structure remaining will be removed and the river bank re-graded for safety and aesthetics. The bank will be graded back from the river edge to meet approximately the existing grade at the future parking lot. There are rock outcrops on the south bank, and it is anticipated that some may be encountered in the re-graded area behind the mill structure. These outcrops will be incorporated into the landscape design of the future county park.

5.0 RESTORATION MONITORING AND SUCCESS CRITERIA

The monitoring plan and success criteria will document the projected benefits of the dam removal after river restoration is completed. Monitoring will be performed for a 5-year period or until success criteria are fulfilled. RS will prepare an annual report that describes monitoring procedures, presents data, compares data to success criteria, and proposes contingency measures if needed. The primary component of the monitoring plan would include anadromous fish and endangered species surveys within and upstream of the impounded areas. The auxiliary ecological benefits from dam removal will generate additional improvements to stream and river functions in the Neuse River Basin. However, these functional benefits are to be used only in the event that migration into the upstream reaches by anadromous fish is not occurring. Other biological, physical, and chemical improvements to the streams and river will be monitored, but are considered auxiliary benefits of this project that may be realized if the primary objective is achieved. These additional criteria will be monitored post project as needed to achieve success criteria as stated in Section 6.3 (Reserve Criteria).

5.1 Baseline (Pre-project) Monitoring

Baseline monitoring in support of reserve criteria have been completed or are underway. Biological collections (fish, mussels, and benthic macroinvertebrates), sediment grain size distribution, river geomorphology, photographic and video plots, and water quality measurements are all part of the monitoring regime. These activities are underway and will be completed prior to dewatering the impoundment. The methodology for the baseline monitoring is described in Section 4.0. The baseline data will be reported in the Mitigation Plan and shall serve as the benchmark for post project monitoring.

5.2 Post Project Monitoring

The primary monitoring component of the plan includes anadromous fish surveys for rivers and streams within and upstream of the former impounded areas. The monitoring plan and success criteria will document the projected benefits of the project after dam removal is completed. Monitoring will be performed for a 5-year period or until success criteria are fulfilled.

Migratory Fish Passage

After dam removal, the distribution of spawning activity of anadromous fish will be monitored within the watershed. Survey stations will be spread out throughout the four mainstem rivers (Little river, Buffalo Creek, Little Buffalo Creek, and Long Branch) and tributaries in the study watershed, up to the first impediment. Monitoring sites will likely include four survey locations (lower, mid, and upper) within the mainstem streams and three in their respective tributaries. Methodology will involve electro shocking, hook and line, and possibly gill netting. Sampling will be done at least weekly during anticipated spawning period, lasting approximately for four to five weeks (See Fish Survey Methods in Section 4.2.2).

Sample stations within the Site Impoundment will be established in proximity to the locations depicted in Figure 8 (Appendix A). Sample stations within the FBA will be established at the time of sampling with the input of NCWRC. Target species include: American shad, alewife, hickory shad, striped bass, sturgeon, and blueback herring.

Success Criteria

The monitoring program will continue to track annual migration within each of the four tributaries in the study watershed (Little River, Buffalo Creek, Little Buffalo Creek, and Long Branch). Success Criteria will require that migration of at least one migratory fish species is progressing towards upper reaches of the project watershed during the five-year monitoring period. If fish passage is arrested during the period, impediments to migration will be identified and methods for correcting the problem established.

5.3 Reserve Criteria

In the event that all or portions of the migratory channel habitat above the impoundment fails to support anadromous fish after 5 years based on sampling data, additional reserve success criteria shall be applied as follows.

5.3.1 Rare and Endangered Species Habitat

The lentic flow regime that currently exists within the impoundment provides habitat characterized by slack, deep water that is likely to exhibit chemical and thermal stratification and does not contain a defined riffle/pool sequence. These conditions are different from the reference upstream/downstream conditions on the Little River that are characterized by higher velocity lotic environments with typically shallow water that allows light penetration to the channel substrate. Additionally, the lotic water mixes the water chemistry and balances the temperature profile while providing a consistent riffle/pool morphology that facilitates opportunistic habitat niches for a variety of macrobenthos and fishes. There are numerous rare aquatic species adapted to lotic habitats that are known to occur in the Little River, immediately up- and down-stream of the Site Impoundment. A principle goal of the project is to restore

approximately 6 river miles of rare aquatic species habitat and re-connect populations of the species that have been disjunct since dam construction in the early 1900s.

The success criteria established by USFWS and the goals of restoring lotic habitats recommends that the composition of the aquatic fauna currently present within the impoundment be established and then monitored for change in composition after the dam is removed. Therefore, documenting such a change involves two phases:

1. Pre-dam removal surveys in order to establish a qualitative baseline of aquatic species (mussel, macro-snail, Neuse River waterdog and fish) present in the impounded reaches and nearby free-flowing reaches of the Little River and Little Buffalo Creek.

2. Monitoring the restored reaches for anticipated change in mussel, macro-snail, Neuse River waterdog and fish composition as a result of restoration for a five-year period.

Pre-project monitoring is described in Section 4.2. Post-project will follow the same sampling methodology.

5.3.2 Stream Stability Analysis and Substrate Composition

Channel stability variables will be measured to monitor the impaired status of this stream restoration reach (within the crest pool) relative to a reference (relatively undisturbed) reach. Sampled variables include channel geometry (bank and bed stability assessment) and sediment (particle size) distribution. These physical variables will be measured after dam removal annually for a five year period.

Channel Geomorphology

Permanent channel cross-sections have been established at 23 locations through the Site Impoundment, on tributaries where functional restoration is expected to occur, and on reference reaches above and below the Site Impoundment to facilitate success evaluation of the project. Each cross-section station has been measured prior to dam removal (pre-removal) and then will be revisited once each successive year of monitoring after the dam has been removed (post-removal). The pre-removal data will be compared to the post-removal data to measure the change of the river channel as the water level recedes into the relict channel and the hydrology returns to a lotic flow regime.

Sediment (Particle Size) Distribution

Sediment size analysis will be conducted at the established cross-sections location above and below the dam (Figures 8 and 9, Appendix A). Sediment samples within the impoundment and within in the reference reaches both above and below the impoundment have been collected and analyzed prior to dam removal.

Sediment cores will be collected annually at each of the 19 permanent cross-section locations within the former impoundment, as well as four in the reference locations to determine the change in particle size distribution. It is anticipated that the sediment particle size distributed

within the impoundment will shift towards increased diameter values after dam removal. Pre-removal data shows a particle size distribution, which is characteristic of an impoundment. Larger particle sizes are found at the uppermost portion of the impoundment, while a particle size reduction is seen within transects closer to the dam.

5.3.3 Benthic Monitoring

Changes in the biotic community are anticipated from a shift in habitat opportunities as the Little River is restored to a lotic flow regime. In-stream, biological monitoring is proposed to track the changes during the monitoring period. The benthic macroinvertebrate community will be sampled using NCDWQ protocols found in the Standard Operating Procedures for Biological Monitoring (NCDWQ 2003). The samples from the sample stations will be compared by their biotic index assigned values (BIAV) for a quantitative change. Additionally, the data will be evaluated for a quantitative difference in abundance and diversity between lotic and lentic stations. As lentic stations transistion to lotic, success will be evaluated based upon values of the community and BIAV data more closely representing the values of the lotic, reference stations than the pre-removal data for that station.

5.3.4 Habitat Assessment

Habitat assessment data will be used to support success evaluation for the Aquatic Community and Threatened and Rare and Endangered Aquatic Species criteria. Data will be used to support improvement in aquatic community populations as well as to demonstrate the presence of habitat for rare species. As the physical parameters of the Site Impoundment become more indicative of a lotic flow regime, the habitat assessment score will quantitatively increase. As lentic stations transition to lotic, success will be evaluated based upon the quantitative habitat values more closely representing the values of the lotic reference stations than the pre-removal data for that station.

5.3.5 Photography and Videography

Digital photography and videography data will be used to support success evaluation for stream and river physical properties and Endangered Aquatic Species, Stream Stability, and Habitat Assessment criterion. Additionally, they will likely be important for station relocation during the post-removal sampling efforts. The data will provide a qualitative evaluation of developing habitat niches, and may be useful post-removal to monitor channel adjustments in reaches that were previously controlled by the Site Impoundment.

6.0 PROJECT DETAILS

6.1 Total Potential Credit

According to the interagency guidance, Determining Appropriate Compensatory Mitigation Credit for Dam Removal Projects, March 22, 2004 (USACE Public Notice 3/23/04), the linear length of impoundment (36,875 linear feet) has been evaluated against the four general criteria (water quality, protected species habitat, improved aquatic community, or anadromous fish passage) and two bonus factors (human recreational or scientific value) for credit determination to assess the possible available credit. It is likely the proposed project should restore, at

minimum, three of four general criteria, and may provide both bonus factors. The available credit has been capped at the linear footage of primary river and tributaries that will be restored within the existing impoundment.

Through re-establishment of anadromous fish habitat within the Site Impoundment (35,940 linear feet), the monitored project will satisfy requirements to be eligible for 2:1 credit. The project is also expected to open 204,920 linear feet of main stem channel to migratory fish passage and access to spawning habitat. The re-introduction of these keystone fish species, communities, and biomass will induce significant improvements to other native (historic) aquatic and terrestrial wildlife guilds within the 82-square mile FBA. These riverine ecosystem benefits will also extend into an additional 452,110 linear feet of major first and second order perennial tributaries in the watershed. Documented re-establishment of anadromous fish use within these streams shall satisfy requirements to be eligible for 5:1 credit.

In the event that all or portions of the migratory channel habitat above the impoundment fails to support anadromous fish after 5 years based on sample data, additional reserve criteria shall be applied. Through re-establishment of rare and endangered species habitat, water quality improvements, and improved aquatic habitat, the monitored project will satisfy requirements to be eligible up to 1.4:1 credit, dependent on the combination of criteria satisfied.

Additionally, RS has entered into an agreement with Johnston County to make the Lowell Mill Dam site the first county park and provide a source of permanent public access to the Little River for fishing, boating, and general river recreation. The impoundment is also being used for research by UNC Ph.D. candidate Adam Riggsbee and others, with the scope of their research above and beyond the monitoring protocols associated with monitoring success. These two bonus factors can produce an additional 20-percent of potential credit associated with this project.

Table 4 provides a summary of proposed scenarios of mitigation credit based upon interagency guidelines. Based on these guidelines, this project will provide a minimum of **36,875 Stream Mitigation Units (SMUs)** within Cataloging Unit 03020201 of the Neuse River Basin.

6.2 Current, Interim, and Ultimate Ownership of Property

RS is the fee-simple owner of the Lowell Mill Dam and associated property. RS has placed a conservation easement over the dam site which is held by the North Carolina Wildlife Habitat Foundation. The conservation easement allows for dam removal, but prevents any dam from being constructed on the site in the future. RS intends to improve the dam site by providing public education and recreation opportunities. RS will remain responsible for project implementation and achievement of success criteria and will ultimately transfer the land deed and conservation easement to Johnston County. The county will be obligated to make the site a permanent public access point to the Little River and manage the site in keeping with other public access properties.

Table 4. Proposed Scenarios of Mitigation Credit.

Criteria	**Channel Restored (feet)**	**Mitigation Ratio**	**SMU**
Anadromous Fish Passage (above crest pool)	204,920 feet of second order or higher, free-flowing tributaries **above the crest pool**	5:1	40,984
	452,110 feet of first order or intermittent tributaries above the crest pool	Undetermined	Undetermined
Anadromous Fish Passage (under crest pool)	35,940 feet of second order or higher, free-flowing tributaries **under the crest pool**	2:1	17,970
Reserve Criteria	**Channel Restored (feet)**	**Mitigation Ratio**	**SMU**
1) Rare and Endangered Aquatic Species 2) Water Quality, 3) Improved Aquatic Community	36,875 feet of free-flowing river and tributaries **under the crest pool**	Up to 1.4:1	25,671
Downstream Benefits Below the Dam	~ 1000 feet below dam	Undetermined	Undetermined
Human Values 1) Scientific value 2) Human recreation	-----	Up to 20 percent bonus	Undetermined
Total Potential SMUs			Undetermined
Total SMUs Provided In This Proposal			36,875

7.0 REFERENCES

Batsavage, C.F. 1997. Life History Aspects of Hickory Shad (Alosa mediocris) in the Albemarle sound/Roanoke River Watershed. East Carolina University, Department of Biology. Greenville, North Carolina.

Burdick, S.M. and J.E. Hightower. May 5, 2005 (unpublished). Draft Final Report: Distribution of Spawning Activity by Migratory Fishes in the Neuse River, North Carolina, After the Removal of Quaker Neck Dam. North Carolina State University, Department of Zoology and U.S. Geological Survey, Cooperative Fish and Wildlife Research Unit. Raleigh, North Carolina.

Christie, R.W. 1978. Spawing Distribution of Blueback Herring, *Alosa aestivalis* (Mitchill), in Abandoned Ricefields and Tributaries of the West Branch of Cooper rivers, South Carolina. Master's Thesis, Clemson University, Clemson, South Carolina.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classifications of Wetlands and Deepwater Habitats of the United States. United States Fish and Wildlife Service. United States Government Printing Office, Washington D.C.

Eddy Engineering, P.C. 2001. Preliminary Findings Report: Lowell Dam Removal. Swansboro, North Carolina.

EcoScience Corporation (ESC). 2005. Lowell Mill Dam Wetland Study. Raleigh, North Carolina.

Horton Jr., J. W. and Zullo, V.A. (eds.). 1991. The Geology of the Carolinas: Carolina Geological Society Fiftieth Anniversary Volume. The University of Tennessee Press. Knoxville, Tennessee.

Loesch, J.G. 1987. Overview of life history aspects of anadromous alewife and blueback herring in freshwater habitats. Common strategies of anadromous and catadromous fishes. American Fisheries Society Symposium 1: 89-103, Boston Massachusetts.

Loesch, J.G. and W.A. Lund. 1977 A Contribution to the Life History of the blueback herring, Alosa aestivalis. Transactions of the American Fisheries Society 106: 583-589.

McPhee, J.A. 2002. The founding Fish. Farrar, Staus and Giroux. New York, New York.

Michaelson, D.L. and R.J. Neves. 1995. Life History and Habitat of the Endangered Dwarf Wege Mussel (*Alasmidonta heterodon*) (Bivalvia: Unionidae). Journal of the North American Benthological Society 14(2):324-340.

North Carolina Dam Removal Task Force (DRTF). 2001 (unpublished). Interagency Memorandum of Agreement for Dam Removal and Dam Removal Ranking System. U.S. Fish and Wildlife Service. Raleigh, North Carolina.

North Carolina Division of Water Quality (NCDWQ). 2002. Neuse River Basin Water Quality Management Plan. North Carolina Department of Environment and Natural Resources, Raleigh.

North Carolina Division of Water Quality (NCDWQ). 2003. Standard Operating Procedures for Benthic Macroinvertebrates. Biological Assessment Unit, Department of Environment, Health and Natural Resources. Raleigh, North Carolina

North Carolina Division of Water Quality (NCDWQ). 2004. Water Quality Assessment and Impaired Waters List (online). Available: http://h2o.enr.state.nc.us/tmdl/General_303d.htm. North Carolina Department of Environment and Natural Resources, Raleigh.

North Carolina Division of Water Quality (NCDWQ). 2005. Basinwide Information Management System (online). Available: http://h2o.enr.state.nc.us/bims/reports/reports.html [July 13, 2005]. North Carolina Department of Environment and Natural Resources, Raleigh.

North Carolina Natural Heritage Program (NHP). 2005. (unpublished-website) http://www.ncnhp.org/. North Carolina Natural Heritage Program. Raleigh, North Carolina.

Rohde, C., Arndt, G., Lindquist, G., and Parnell, F. 1994. Freshwater Fishes of the Carolinas, Virginia, Maryland, and Delaware. Chapel Hill, The University of North Carolina Press.

Rulifson, R.A. 1994. Status of Anadromous Alosa along the East Coast of North America. Anadromous Alosa Symposium, Tidewater Chapter American Fisheries Society. Virginia Beach, Virginia.

Schafale, M. P. and Weakley, A. S. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, N.C. Department of Environment, Health, and Natural Resources. Raleigh, NC.

Smith, H.M 1907. The Fishes of North Carolina. Volume !!. North Carolina Geological Survey. Raleigh, North Carolina.

United States Army Corps of Engineers (USACE). 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

United States Department of Agriculture (USDA). 1994. Soil Survey of Johnston County, North Carolina. Soil Conservation Service.

United States Environmental Protection Agency (EPA). 2001. Integrated Water Quality Monitoring Assessment Report Guidance. November 19, 2001.

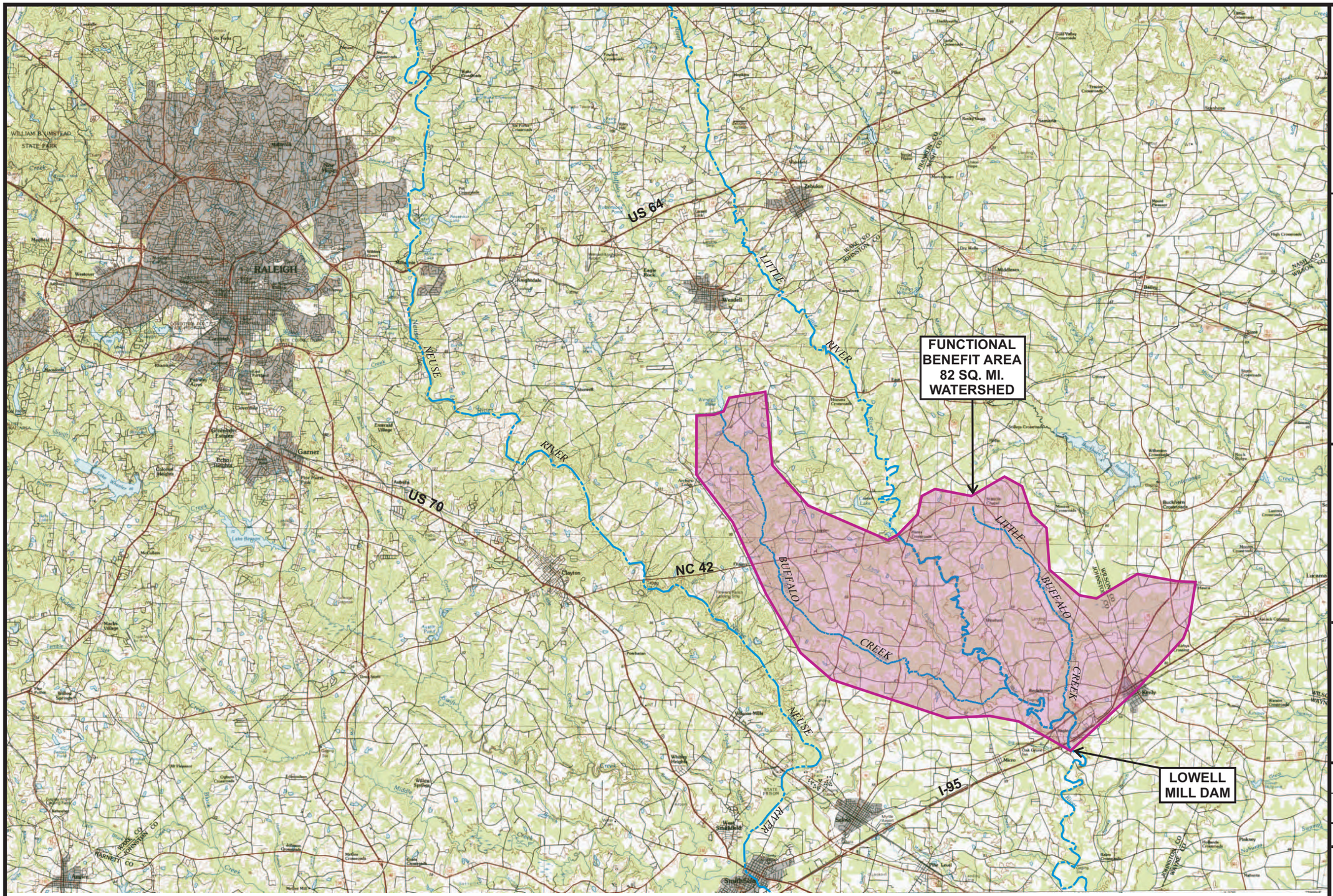
United States Fish and Wildlife Service (USFWS). 2005. (unpulished-website). http:nc-es.fws.gov/coastal/rainsdamremoval.html. United States Fish and Wildlife Service. Raleigh, North Carolina.

United States Fish and Wildlife Service (USFWS). 2005b. (unpulished-website). http:nc-es.fws.gov/es/es.html. United States Fish and Wildlife Service. Raleigh, North Carolina.

Walburg, C.H. and P.R. Nichols. 1967. Biology and Management of the American Shad and Staus of the Fisheries, Atlantic Coast of the Untied States of the Interior. Washington, D.C.

APPENDIX A

FIGURES



EcoScience Corporation

Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC

Natural Resources Restoration & Conservation

Ecosystem Enhancement PROGRAM

Project:

LITTLE RIVER-LOWELL MILL DAM RESTORATION SITE

Johnston County
North Carolina

Title:

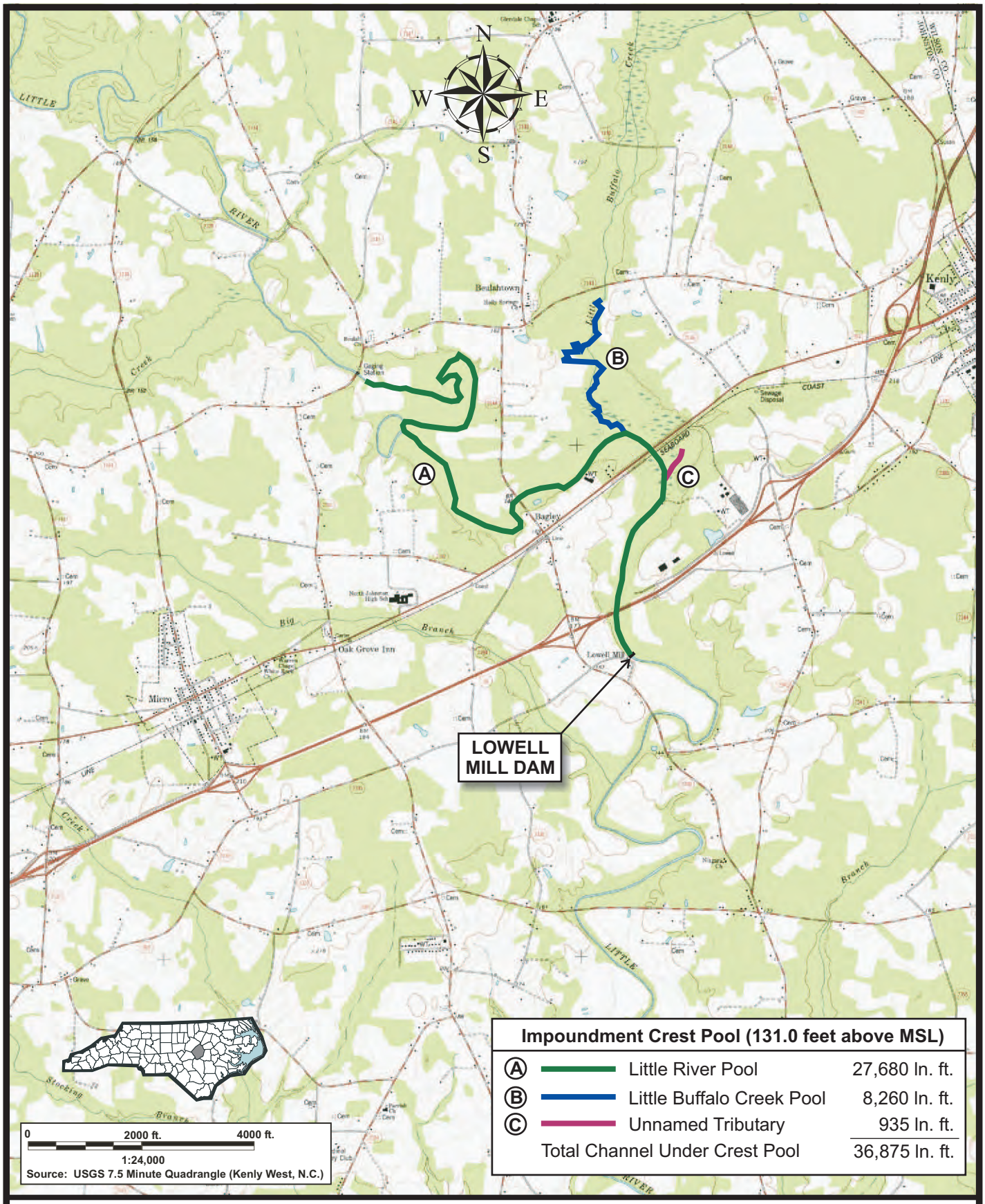
SITE LOCATION

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	As Shown

ESC Project No.: 05-242.03

FIGURE

1



EcoScience Corporation
Raleigh, North Carolina

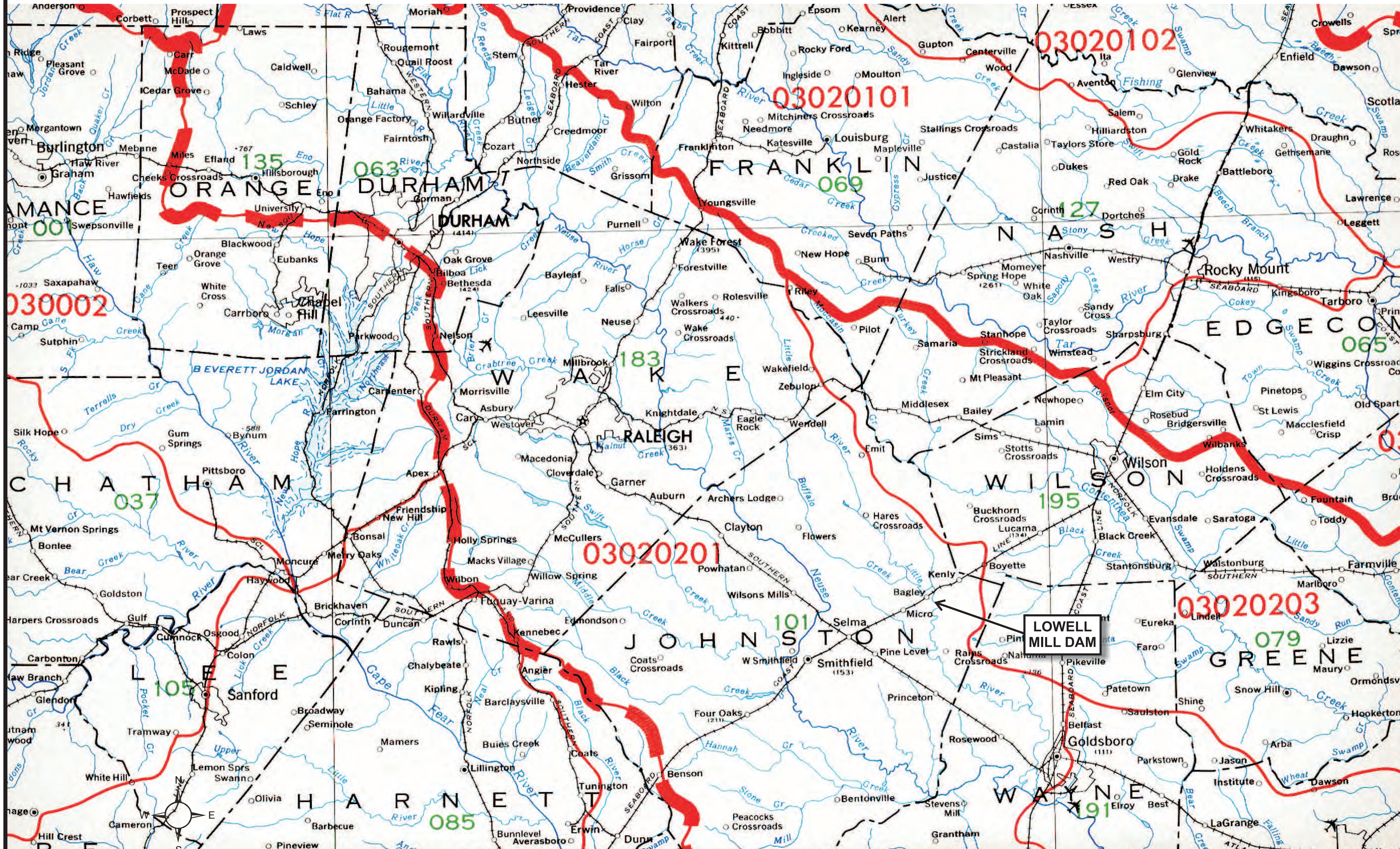
STREAM RESTORATION CORRIDOR

Little River-Lowell Mill Dam Restoration Site

Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JWG
Date:	JUL 2005
Project:	05-242.03

FIGURE 2



0 5 mi. 15 mi.

1:660000

Source: 1974 North Carolina Hydrologic Unit Map

N
W E
S

EcoScience Corporation

Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC

Natural Resources Restoration & Conservation

Ecosystem Enhancement PROGRAM

Project:

LITTLE RIVER-LOWELL MILL DAM RESTORATION SITE

Johnston County
North Carolina

Title:

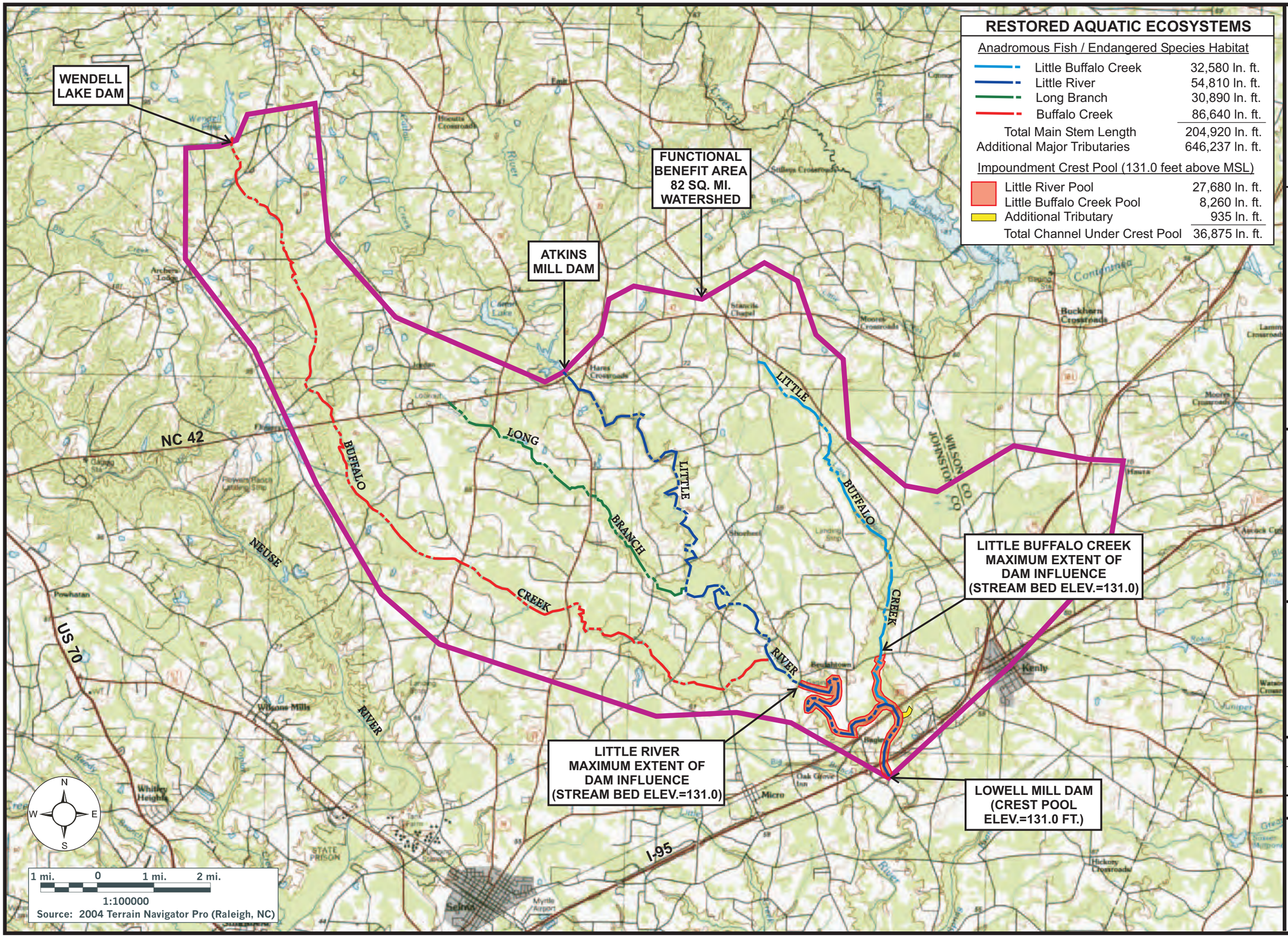
USGS SUB-BASIN AND 8-DIGIT HYDROLOGIC UNIT

Dwn By: MAF	Date: JUL 2005
Ckd By: JWG	Scale: As Shown

ESC Project No.: 05-242.03

FIGURE

3



RESTORED AQUATIC ECOSYSTEMS

Anadromous Fish / Endangered Species Habitat

Little Buffalo Creek	32,580 ln. ft.
Little River	54,810 ln. ft.
Long Branch	30,890 ln. ft.
Buffalo Creek	86,640 ln. ft.
Total Main Stem Length	204,920 ln. ft.
Additional Major Tributaries	646,237 ln. ft.

Impoundment Crest Pool (131.0 feet above MSL)

Little River Pool	27,680 ln. ft.
Little Buffalo Creek Pool	8,260 ln. ft.
Additional Tributary	935 ln. ft.
Total Channel Under Crest Pool	36,875 ln. ft.

EcoScience Corporation
Raleigh, North Carolina

Client:

Restoration Systems, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement Program

Project:

LITTLE RIVER-LOWELL MILL DAM RESTORATION SITE

Johnston County
North Carolina

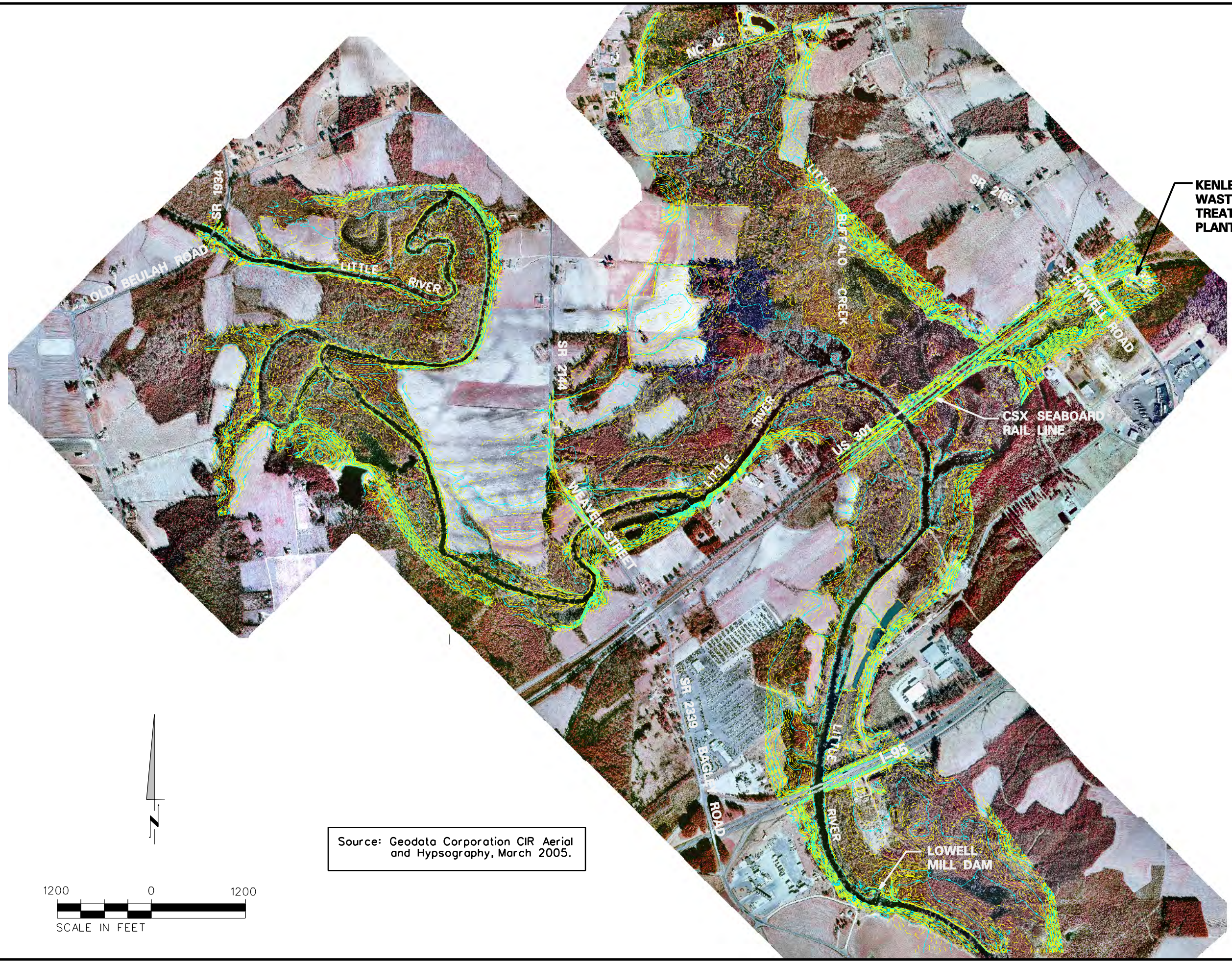
Title:

FUNCTIONAL BENEFIT AREA

Dwn By: MAF	Date: JUL 2005
Ckd By: JWG	Scale: As Shown
ESC Project No.: 05-242.03	

FIGURE

4



EcoScience Corporation
Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement Program

Project:

LITTLE RIVER–LOWELL MILL DAM RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

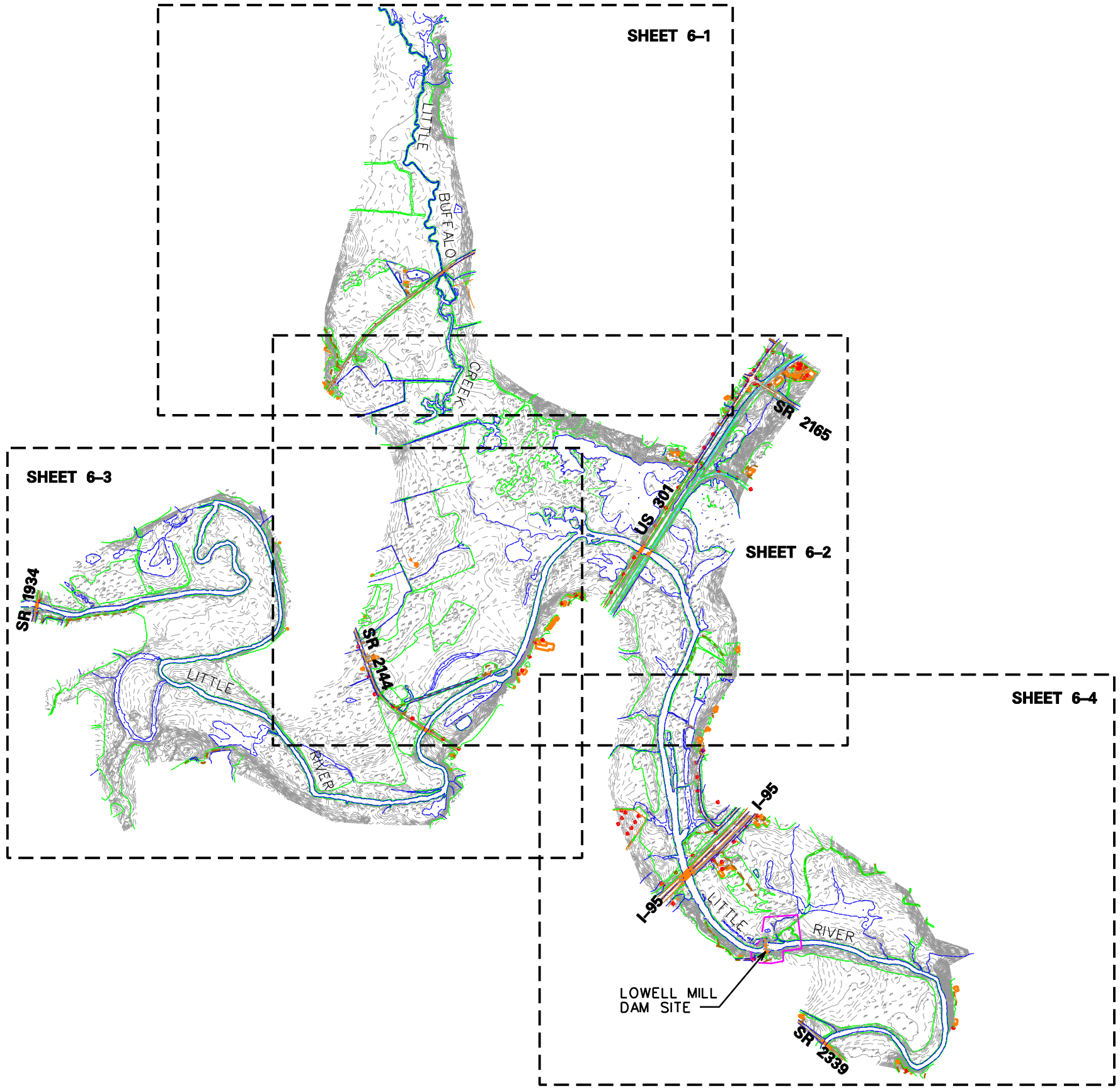
2005 AERIAL PHOTOGRAPH

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	1"=1200'

ESC Project No.: 05-242.03

FIGURE

5



EcoScience Corporation
Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement PROGRAM

Project:

LITTLE RIVER–LOWELL MILL DAM RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

PHYSIOGRAPHY, TOPOGRAPHY AND LAND USE

SHEET INDEX

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
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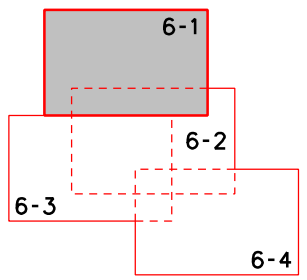
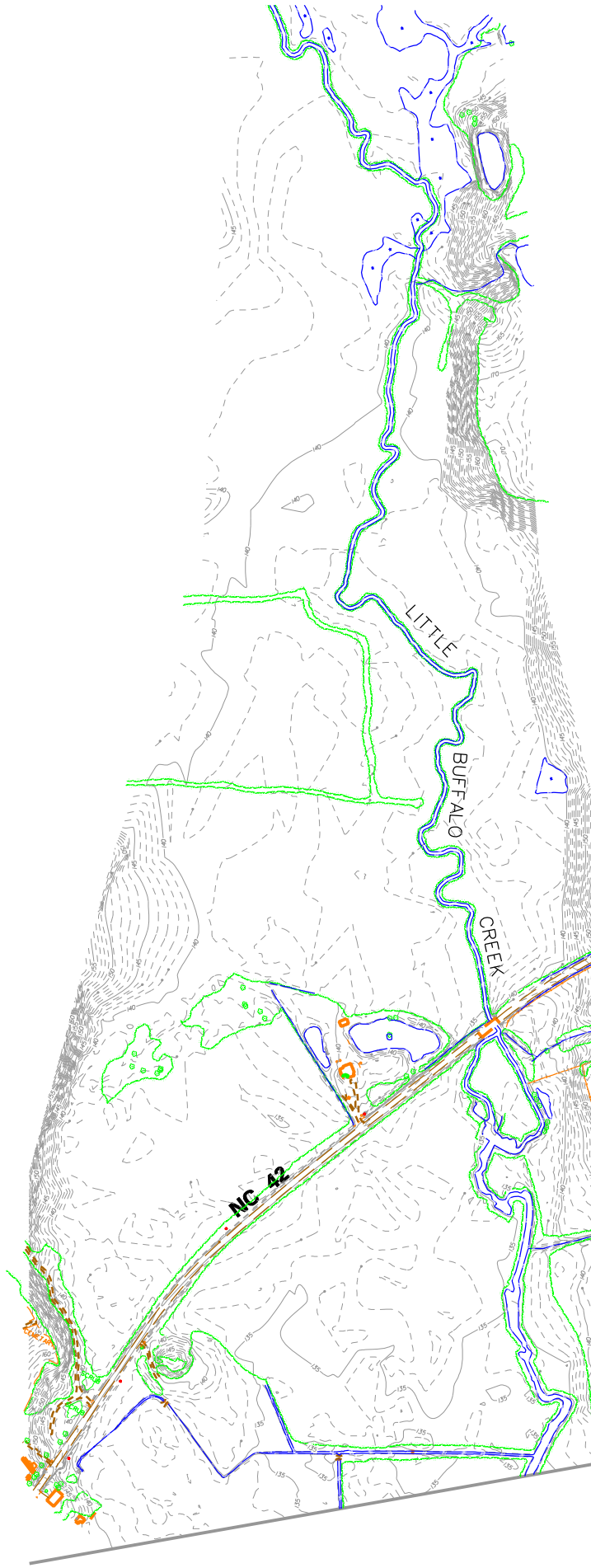
ESC Project No.: 05-242.03

FIGURE

6





LEGEND

- —140— MAJOR CONTOURS
- ------ MINOR CONTOURS
- ——— EXISTING STREAM
- EXISTING BUILDING
- ------ EXISTING ROAD
- EXISTING TREE LINE

600 0 600

SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement PROGRAM

Project:

LITTLE RIVER–LOWELL MILL DAM RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

PHYSIOGRAPHY, TOPOGRAPHY AND LAND USE

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
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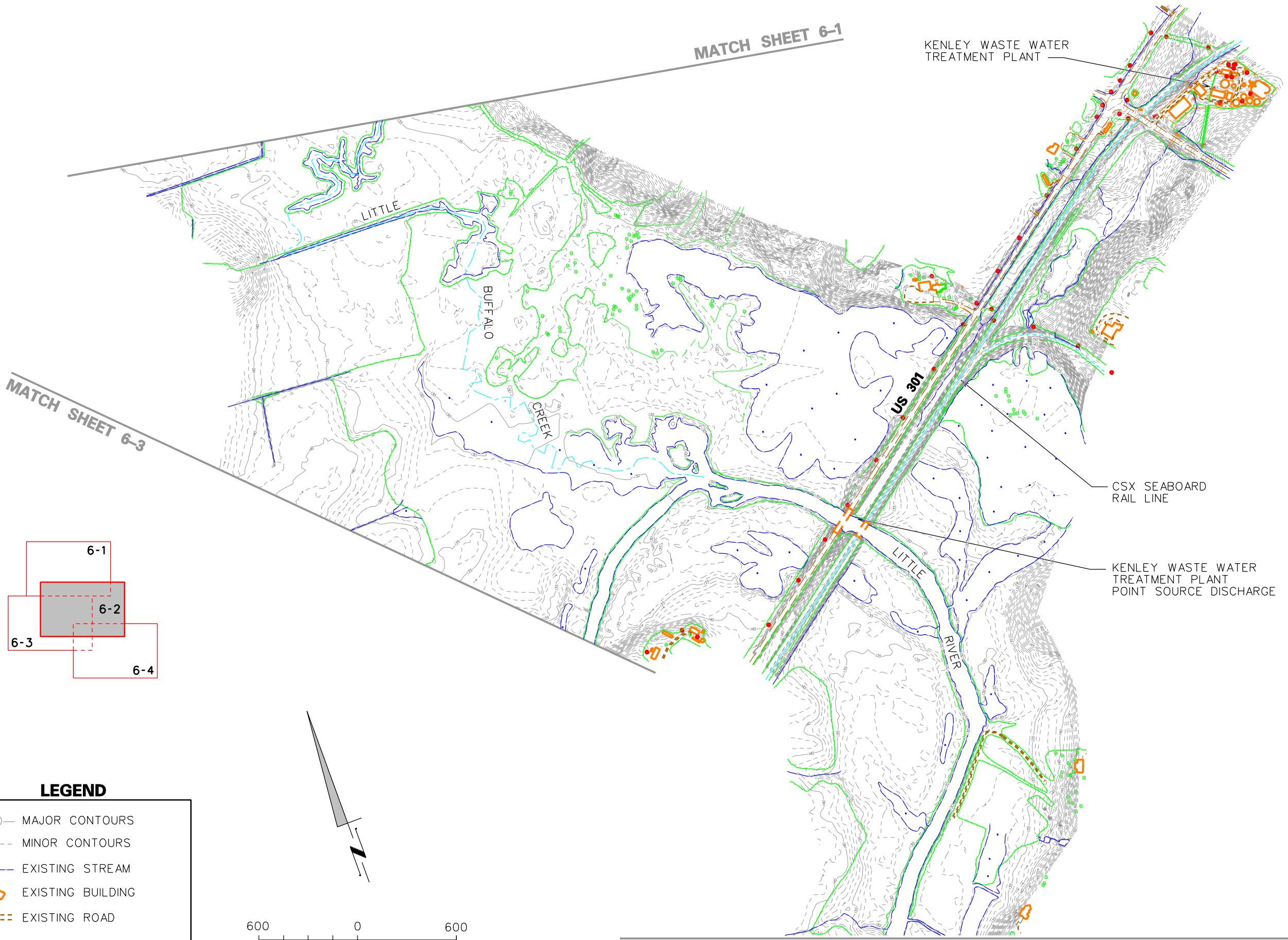
ESC Project No.: 05-242.03

FIGURE

6–1



LEGEND

- —140— MAJOR CONTOURS
- ------ MINOR CONTOURS
- EXISTING STREAM
- EXISTING BUILDING
- EXISTING ROAD
- EXISTING TREE LINE

EcoScience Corporation
Raleigh, North Carolina

Client:

Restoration Systems, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement Program

Project:

LITTLE RIVER–LOWELL MILL DAM RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

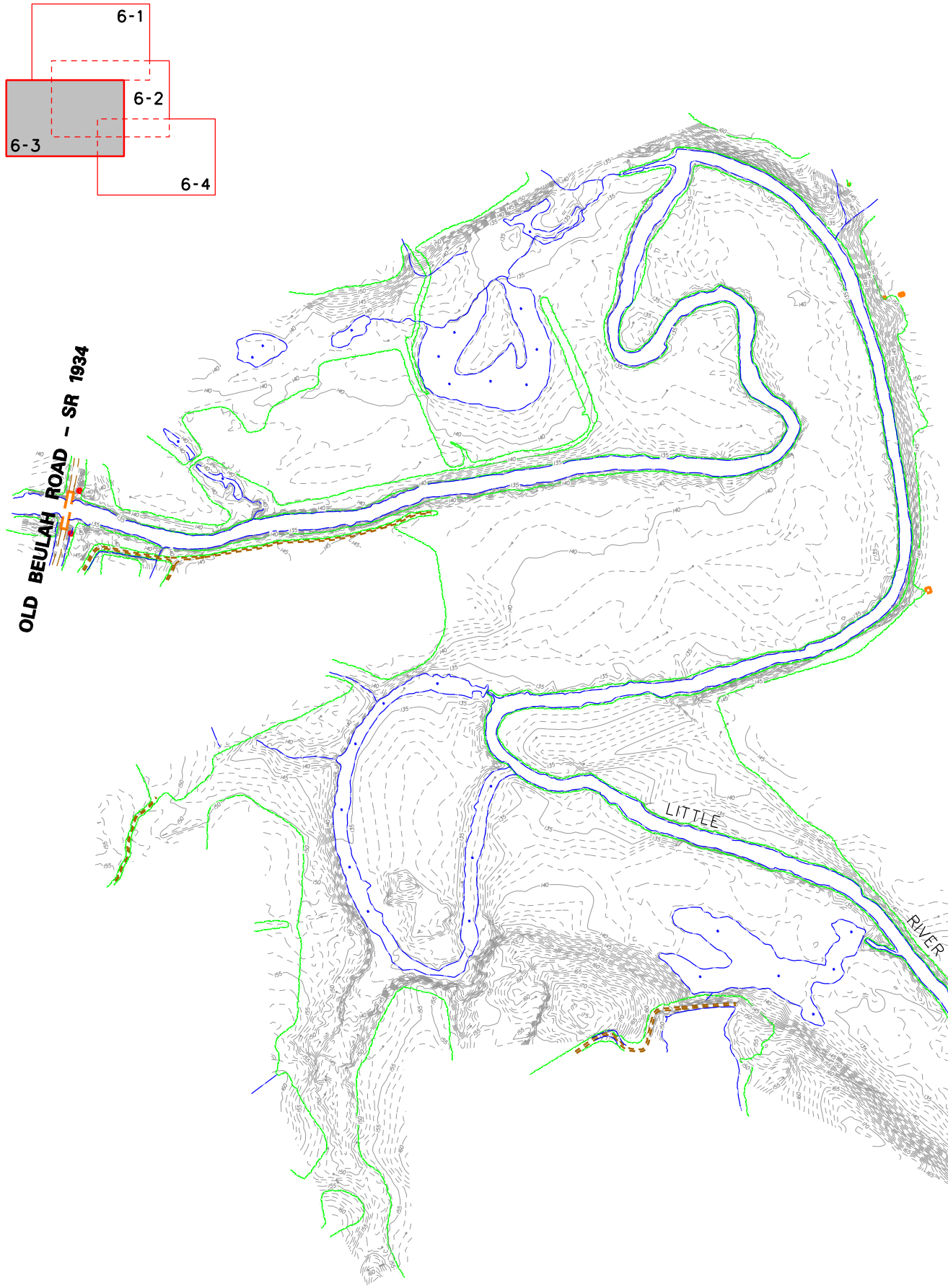
PHYSIOGRAPHY, TOPOGRAPHY AND LAND USE

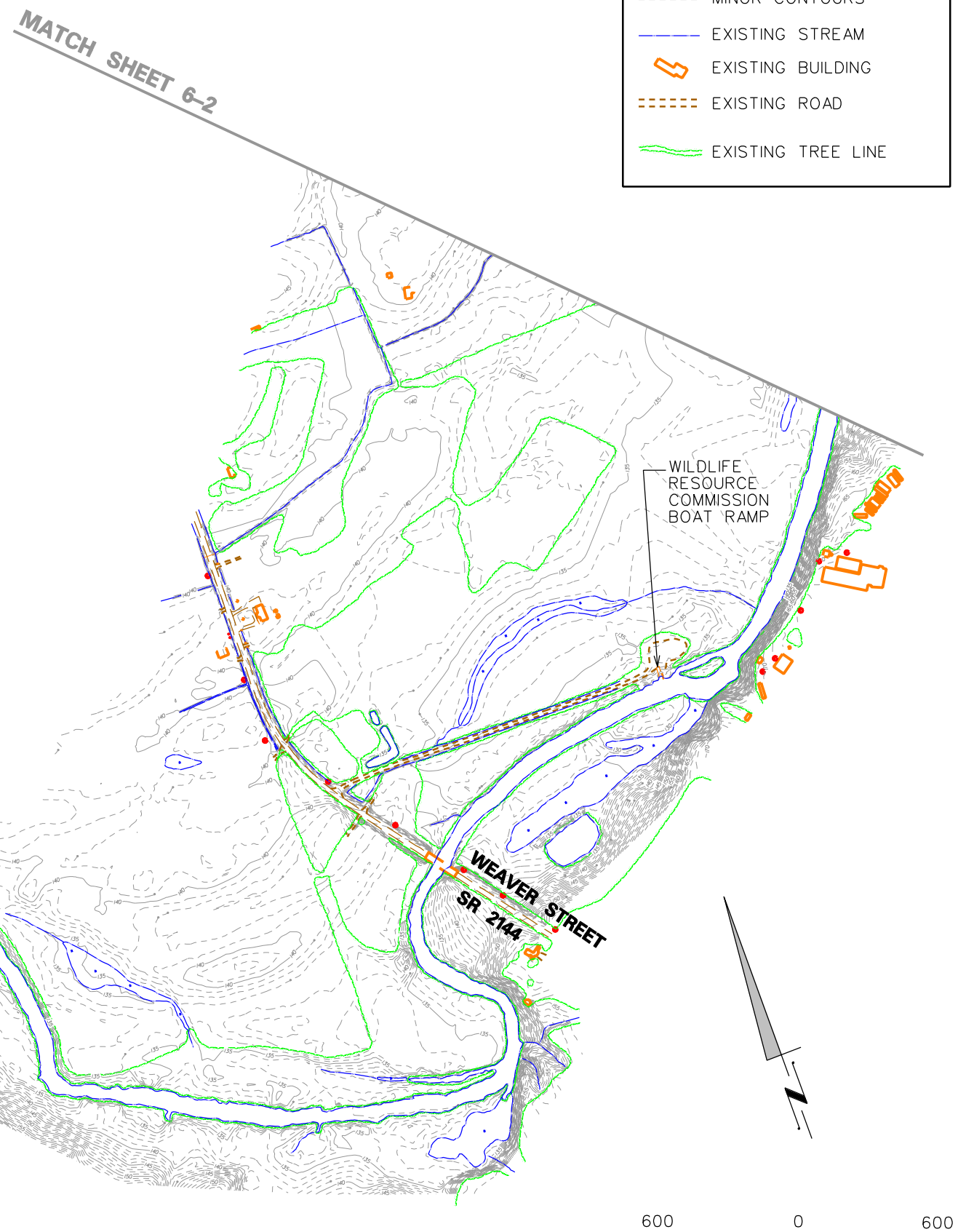
Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	1"=600'

ESC Project No.: 05-242.03

FIGURE

6–2





LEGEND

- 140 MAJOR CONTOURS
- MINOR CONTOURS
- EXISTING STREAM
- EXISTING BUILDING
- EXISTING ROAD
- EXISTING TREE LINE

600 0 600

SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement PROGRAM

Project:

LITTLE RIVER–LOWELL MILL DAM RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

PHYSIOGRAPHY, TOPOGRAPHY AND LAND USE

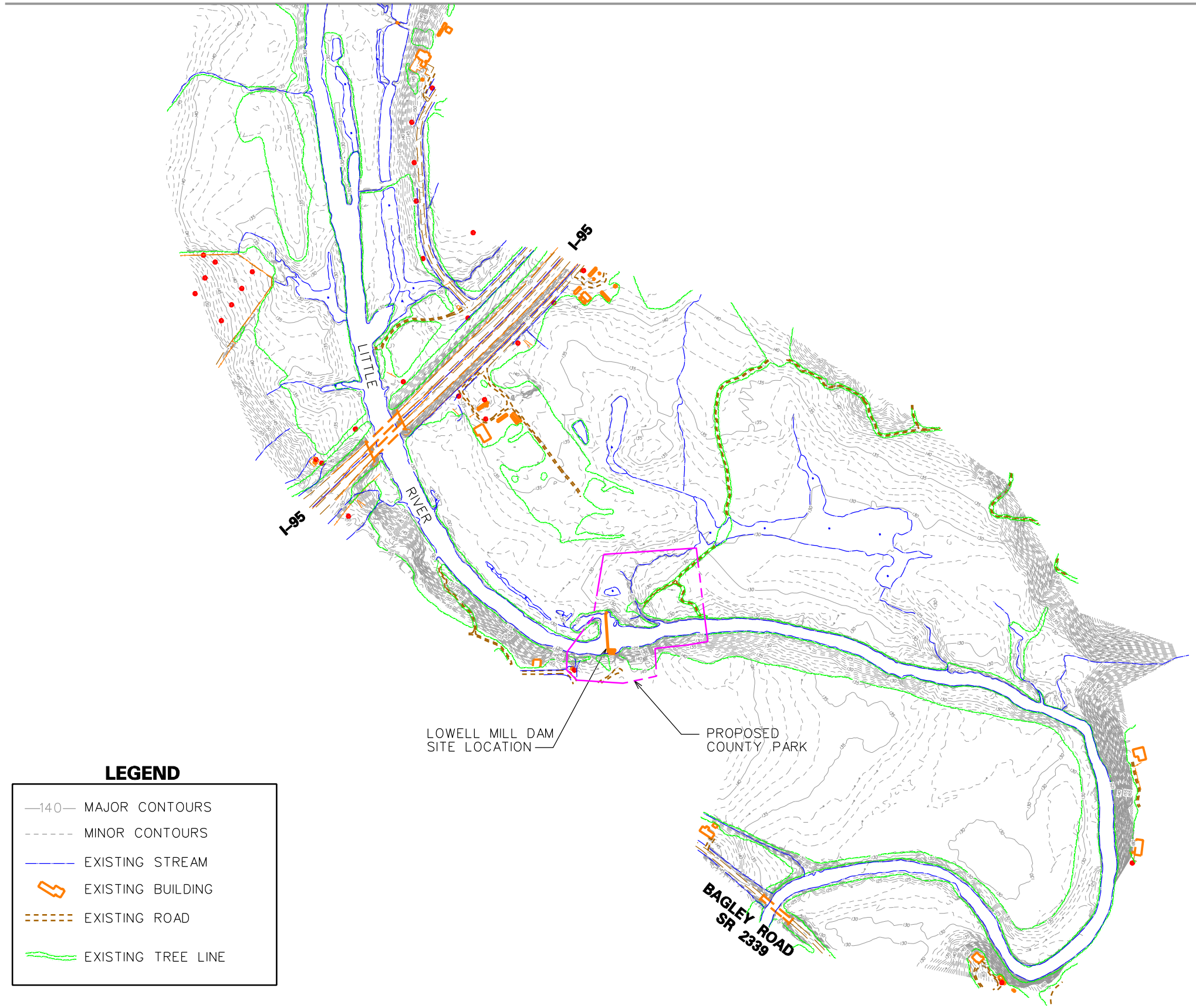
Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	1"=600'

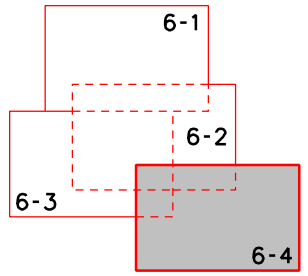
ESC Project No.: 05-242.03

FIGURE

6–3

MATCH SHEET 6–2





LEGEND

- 140 MAJOR CONTOURS
- MINOR CONTOURS
- EXISTING STREAM
- EXISTING BUILDING
- EXISTING ROAD
- EXISTING TREE LINE

600 0 600

SCALE IN FEET

EcoScience Corporation
Raleigh, North Carolina

Client:

Restoration Systems, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement Program

Project:

LITTLE RIVER–LOWELL MILL DAM RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

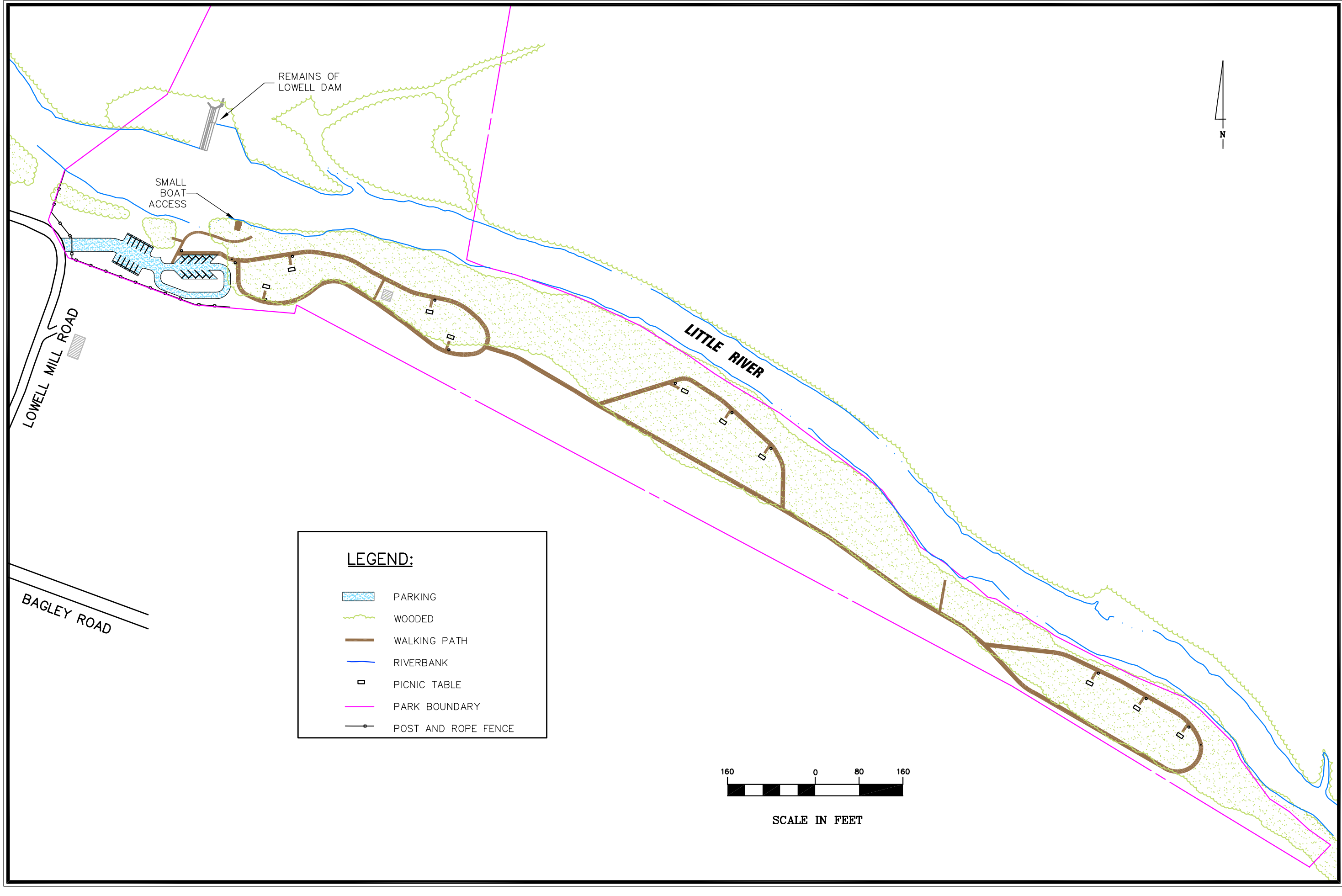
PHYSIOGRAPHY, TOPOGRAPHY AND LAND USE

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	1"=600'

ESC Project No.: 05-242.03

FIGURE

6–4



RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

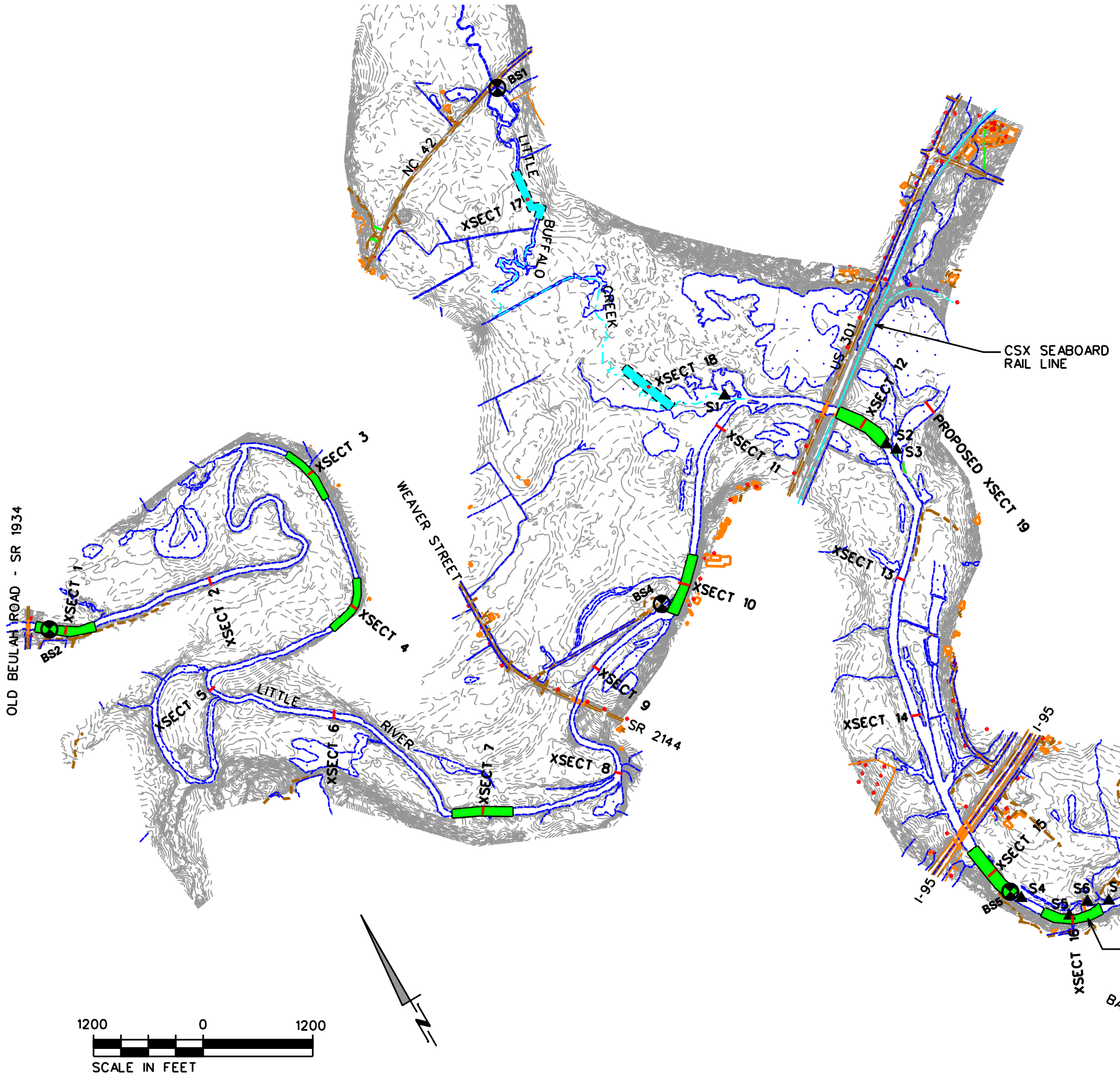
Engineering, Landscape Architecture and Environmental Science
MILONE & MACBROOM®
307B Falls Street
Greenville, South Carolina 29601
(864) 271-9598 Fax (864) 271-4135
www.miloneandmacbroom.com

JOHNSTON COUNTY PARK CONCEPT PLAN
LOWELL MILL DAM
LITTLE RIVER WATERSHED RESTORATION SITE
KENLY, NORTH CAROLINA

PBS	JD	KWK
DESIGNED	DRAWN	CHECKED

SCALE 1"=160'
DATE --
PROJECT NO. 2691-02
DWG NAME CONCEPT

FIGURE
7



LEGEND

- —140— MAJOR CONTOURS
- - - - MINOR CONTOURS
- EXISTING STREAM
- EXISTING BUILDING
- EXISTING ROAD
- CROSS-SECTION LOCATION
- MACROINVERTEBRATE BIOLOGICAL SAMPLING LOCATION
- POTENTIAL FUTURE AQUATIC SURVEY LOCATION (200m IN LENGTH)
- AQUATIC SURVEY LOCATION (200m IN LENGTH)
- S1▲ SEDIMENT SAMPLING LOCATION

EcoScience Corporation
Raleigh, North Carolina

Client:

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

Ecosystem Enhancement PROGRAM

Project:

LOWELL MILL DAM– LITTLE RIVER WATERSHED RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

Title:

RESERVE CRITERIA

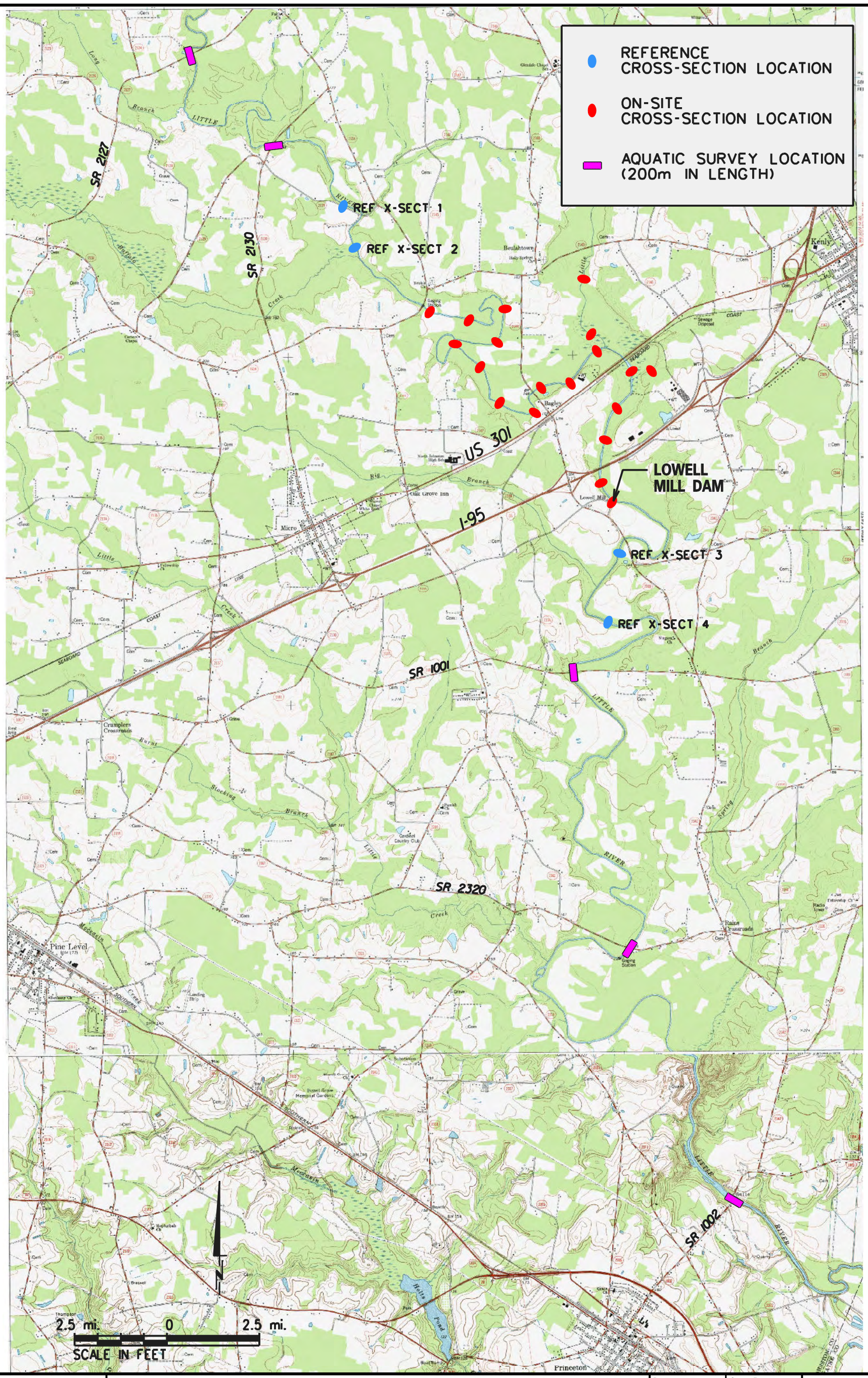
ON-SITE MONITORING LOCATIONS

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	1"=1200'

ESC Project No.: 05-242.03

FIGURE

8



EcoScience Corporation
Raleigh, North Carolina

Project:

RESERVE CRITERIA: REFERENCE MONITORING LOCATIONS

LOWELL MILL DAM - LITTLE RIVER WATERSHED RESTORATION SITE

Johnston County, North Carolina

Dwn By:	Ckd By:	FIGURE
MAF	JWG	
Date: JUL 2005		
Scale: 1"=14000'		9
ESC Project No.: 05-242.03		

INTERSTATE 95

LITTLE RIVER

TAYLOR PROPERTY

SECONDARY NORTHERN ACCESS (ONLY IF REQUIRED)

PROPOSED JOHNSTON COUNTY PARK

LOWELL DAM

EXISTING CONSTRUCTION EASEMENT

PRIMARY CONSTRUCTION ACCESS

LOWELL MILL ROAD

BAGLEY ROAD

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Consulting

Engineering, Landscape Architecture and Environmental Science
MILONE & MACBROOM®
307B Falls Street
Greenville, South Carolina 29601
(864) 271-9598 Fax (864) 271-4135
www.miloneandmacbroom.com

CONSTRUCTION ACCESS

LOWELL MILL DAM
LITTLE RIVER WATERSHED RESTORATION SITE

KENLY, NORTH CAROLINA

KWK	JD	--
DESIGNED	DRAWN	CHECKED

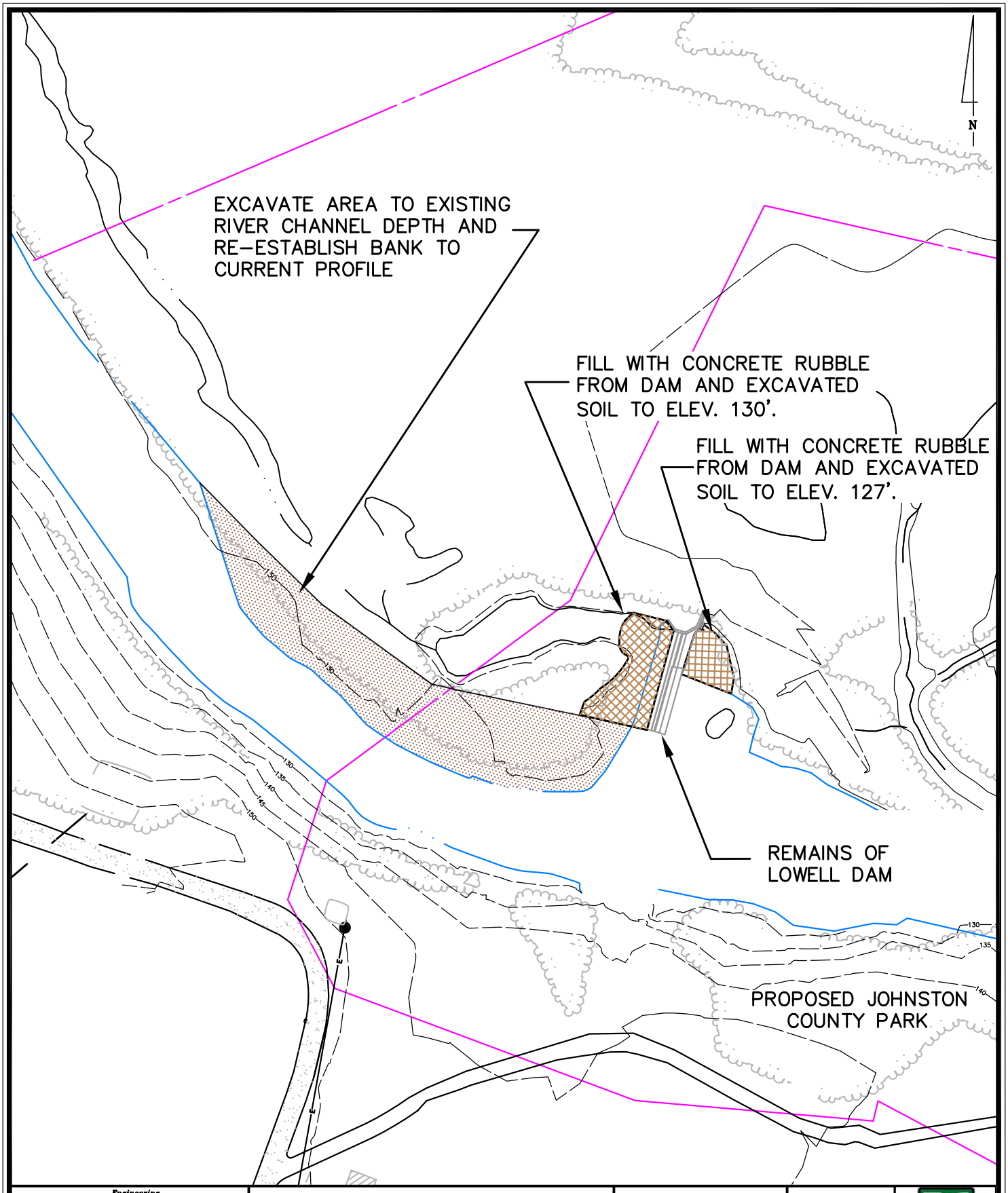
SCALE 1"=200'

DATE --

PROJECT NO. 2691-02

DWG NAME CONSTRUCTION

FIGURE
10



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LOWELL MILL DAM
LITTLE RIVER WATERSHED RESTORATION SITE

CHANNEL RECONFIGURATION

DATE:

SCALE: N.T.S.

FIGURE: 11

RESTORATION SYSTEMS, LLC
Natural Resources Restoration & Conservation

APPENDIX B

PRIORITY DAMS FOR REMOVAL AS LISTED BY DRTF

Preliminary Dam Prioritization through Rankings of Environmental Advantages of Dam Removal. These ratings have been performed by agency representatives involved in the Dam Removal Task Force of North Carolina.

	Threatened & Endangered Species Value				Water Quality Value			Anadramous Fish Value					
Dam	**NCWRC**	**NHP**	**USFWS**	**Mean**	**DWQ-Pen**	**EPA**	**Mean**	**NCMFS**	**NCWRC**	**NMFS**	**USFWS**	**Mean**	**Mean of Means**
Lowell	4.0	4.0	4.0	4.0	4.0	3.5	3.8	3.0	5.0	3.0	3.0	3.5	3.75
Lock & Dam #2	3.0	3.0	4.0	3.3	1.0	4.0	2.5	4.0	4.0	5.0	5.0	4.5	3.44
Lock & Dam #3	3.0	3.0	3.0	3.0	1.0	4.0	2.5	4.0	3.0	5.0	5.0	4.3	3.25
Carbonton Dam	5.0	5.0	5.0	5.0	4.0	4.0	4.0	0.0	0.0	1.0	1.0	0.5	3.17
Atkinson's Millpond	4.0	4.0	4.0	4.0	3.0	4.0	3.5	2.0	4.0	1.0	1.0	2.0	3.17
Fishing Creek Millpond	4.0	4.0	5.0	4.3	3.0	3.5	3.3	3.0	0.0	2.0	2.0	1.8	3.11
Buckhorn	3.0	3.0	4.0	3.3	2.0	3.5	2.8	2.0	2.0	4.0	4.0	3.0	3.03
Rocky Mount Millpond	3.0	3.0	1.0	2.3	4.0	4.5	4.3	2.0	1.0	2.0	2.0	1.8	2.78
Milburnie	1.0	1.0	2.0	1.3	0.0	4.6	2.3	2.0	5.0	5.0	5.0	4.3	2.63
Wiggins Millpond	1.0	1.0	1.0	1.0	3.0	4.5	3.8	2.0	3.0	2.0	2.0	2.3	2.33
Hoggards Mill	0.0	0.0	0.0	0.0	3.0	3.5	3.3	4.0	5.0	2.0	2.0	3.3	2.17

DRTF agencies include U.S. Environmental Protection Agency (USEPA), U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), N.C. Division of Water Quality (NCDWQ), N.C. Wildlife Resources Commission (NCWRC), N.C. Division of Marine Fisheries (NCDMF), N.C. Division of Coastal Management (NCDCM), and the N.C. Natural Heritage Program (NCNHP)

Source: Meeting minutes from February 21, 2002 meeting; Taken from memo written by David Schiller, NCDOT

APPENDIX C

PROJECTED FUNCTIONAL BENEFIT AREA

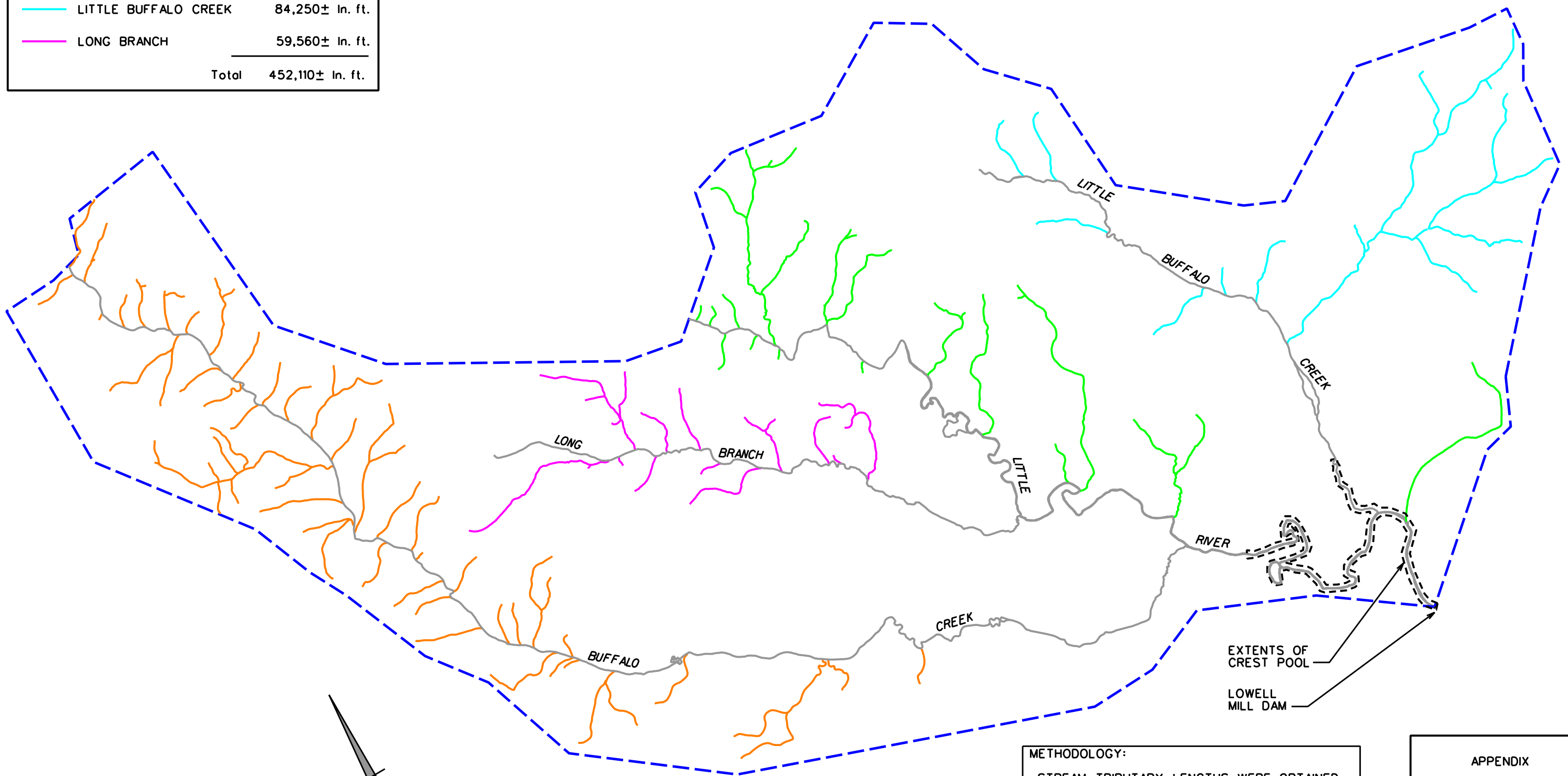
PROJECTED FUNCTIONAL BENEFIT AREA

LOWELL MILL DAM – LITTLE RIVER WATERSHED RESTORATION SITE

JOHNSTON COUNTY, NORTH CAROLINA

LEGEND

FUNCTIONAL BENEFIT AREA	
TRIBUTARY LENGTHS	
BUFFALO CREEK	199,490± ln. ft.
LITTLE RIVER	108,810± ln. ft.
LITTLE BUFFALO CREEK	84,250± ln. ft.
LONG BRANCH	59,560± ln. ft.
Total	452,110± ln. ft.



6000 0 6000

SCALE IN FEET

METHODOLOGY:

STREAM TRIBUTARY LENGTHS WERE OBTAINED BY SELECTING TRIBUTARIES FROM NCCGIA 24K NEUSE RIVER BASIN HYDROLOGY LAYER THAT INTERSECTED WITH THE MAIN STEM OF THE TARGET CHANNEL, UPTO AND INCLUDING FIRST ORDER TRIBUTARIES. TRIBUTARY LENGTHS DO NOT PROGRESS BEYOND POND OUTFLOWS.

APPENDIX

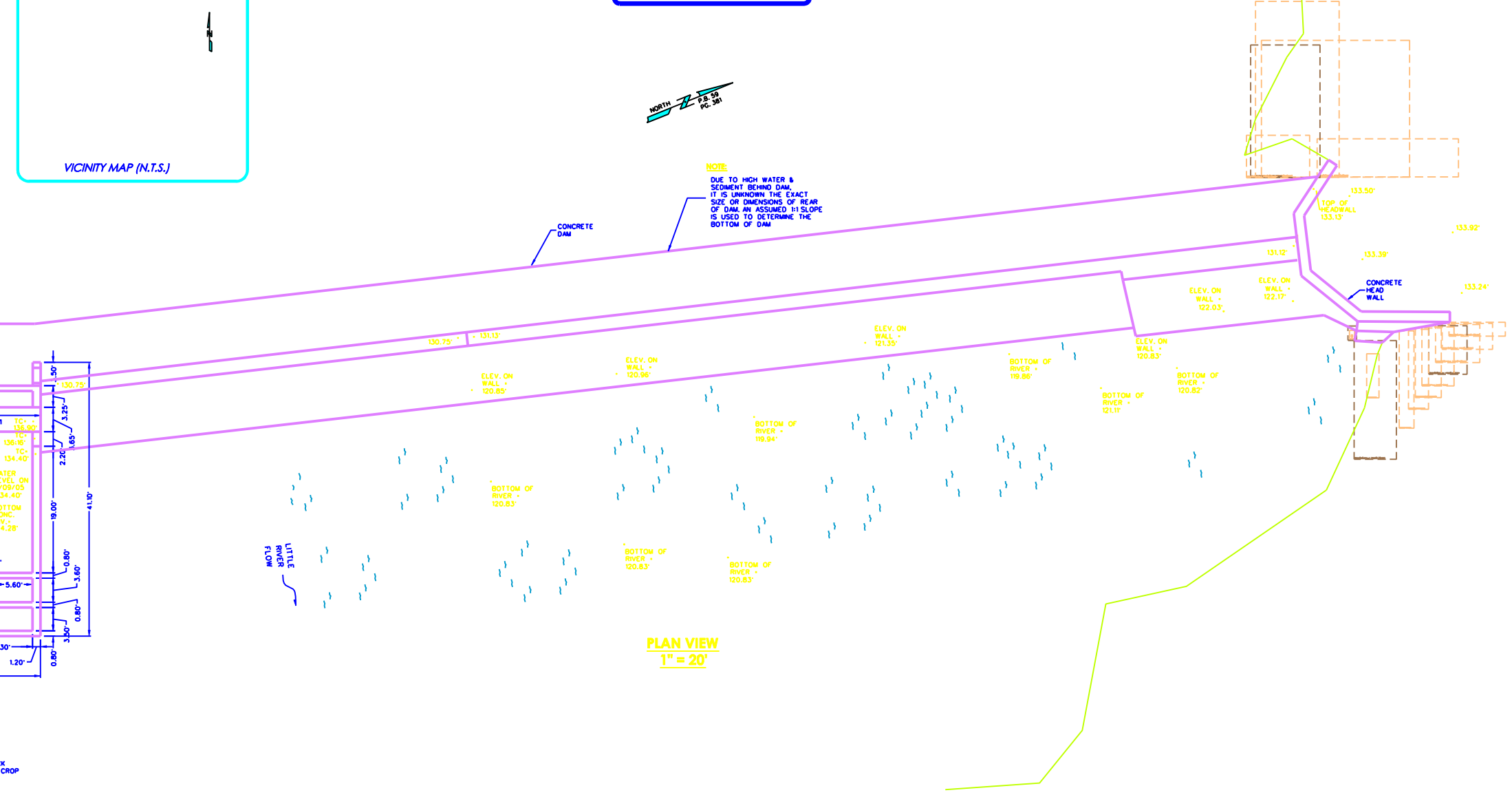
C

APPENDIX D

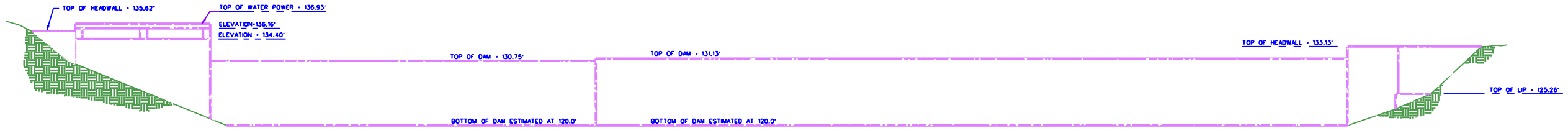
LOWELL MILL DAM STRUCTURE SURVEY

THIS AREA REPRESENTED BY THIS PLAT IS LOCATED IN A FLOOD HAZARD BOUNDARY ACCORDING TO FEMA MAP NUMBER(S) 3710X10260 D ZONE(S) AE, DATED OCTOBER 20, 2000.

VICINITY MAP (N.T.S.)



PLAN VIEW
1" = 20'



FRONT ELEVATION VIEW
1" = 20'

CERTIFICATE OF ACCURACY AND MAPPING:

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous materialsites, underground utilities or any other features above, or below ground other than those shown.

I certify that the survey is of an existing building or other structure.

I certify that the elevations shown on said plat, meet the requirements of a Class C topographic survey in the State of North Carolina.

I JOHN A. ARRINGTON, III this plat was drawn under my supervision from (an actual survey made under my supervision) (deed description recorded in Book XXX, Page XXX etc.) (other) that the ratio of precision as calculated by latitudes and departures is 1/ 10,000+ ; that the boundaries not surveyed are shown as broken lines plotted from information found in Book XXX, Page XXX; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, registration number, and seal this 8th day of September, 20 04 .

SEAL OR STAMP

Surveyor L-4194

GENERAL NOTES:

1. ELEVATIONS ARE BASED ON NGVD 1929
2. BENCHMARK USED: NCGS MARKER "BAGLEY" WITH AN ELEVATION = 177.04' MSL.
3. ALL COORDINATES ARE NORTH CAROLINA STATE PLANE COORDINATES 1983.
4. TBM#1 IS "FIXE" BOLT IN CONCRETE. TOP OF BOLT = 136.93'

OWNER
RESTORATION SYSTEMS, LLC
1101 HAYES STREET
SUITE 107
RALEIGH, NC 27604
(919) 755-9490

BEFORE YOU DIG.....
North Carolina One-Call Center, Inc.
Call 48 Hours Before You Dig!
1-800-632-4949

AS BUILT FOR
RESTORATION SYSTEMS, LLC
(LOWELL MILL DAM SITE)

BEULAH TOWNSHIP JOHNSTON COUNTY NORTH CAROLINA

10 5 0 10 20 30

GRAPHIC SCALE 1" = 20'

APPENDIX

D

APPENDIX E

LOWELL MILL DAM WETLAND STUDY
ECOSCIENCE CORPORATION

LOWELL MILL DAM WETLAND STUDY

LOWELL MILL DAM-LITTLE RIVER WATERSHED RESTORATION SITE

PREPARED FOR:

RESTORATION SYSTEMS, LLC
1101 HAYNES STREET SUITE 107
RALEIGH, NORTH CAROLINA 27604

PREPARED BY:

ECOSCIENCE CORPORATION
1101 HAYNES STREET, SUITE 101
RALEIGH, NORTH CAROLINA 27604

JULY 2005

TABLE OF CONTENTS

APPENDICES

FIGURES

1.0 INTRODUCTION

1.1 Project Description

In response to an Ecosystem Enhancement Program (EEP) Full-Delivery Request for Proposals (RFP) issued in May 2003, Restoration Systems, LLC has proposed the restoration of approximately 36,875 linear feet of stream channel as the result of the removal of Lowell Mill Dam on the Little River in Johnston County, North Carolina (Figure 1, Appendix A). Implementation of the dam removal project will adhere to North Carolina's Guidance: Compensatory Mitigation Ratios for Dam Removal Projects (Version 3.1). This guidance was developed by the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), Environmental Protection Agency (EPA), N.C. Division of Water Quality (NCDWQ), and the N.C. Wildlife Resources Commission (WRC). The North Carolina Dam Removal Task Force, comprised of federal and state agencies, designated the Lowell Mill Dam as the highest priority dam for removal in North Carolina (NCDRTF 2001). The dam has been targeted for removal primarily because of water quality degradation, anadromous and migratory fish blockage, and the disjunctive distribution of endangered species above and below waters impounded by the dam.

The project site includes the Lowell Mill Dam and associated structures situated on the Little River, approximately 0.3 mile south (downstream) of Interstate 95 between the towns of Micro and Kenly. The projected functional benefit area (FBA) for the dam removal includes the upstream Little River watershed, situated in Hydrologic Unit 03020201. This area includes approximately 204,920 linear feet (38.8 miles) of stream and river channel along the Little River, Buffalo Creek, Little Buffalo Creek, and Long Branch in Johnston County, NC and an additional 452,110 linear feet of first and second order perennial tributaries in the watershed. The watershed begins at Lowell Mill Dam within the Little River and extends upstream to include relatively free-flowing (unimpeded) tributaries in the watershed. These streams and rivers represent critical restoration opportunities for anadromous and migratory fish, endangered species, water quality, and other important aquatic species and guilds within the region.

1.2 Wetland Concerns

Little Buffalo Creek is the only major, higher order tributary within the project's projected FBA with portions of its channel below the dam crest pool elevation of 131 feet above mean sea level (MSL). A large, contiguous riparian wetland area extends along the Little Buffalo Creek floodplain. This wetland system broadens at the stream's confluence with the Little River approximately 1,800 feet upstream of Highway 301 (Figure 1). Portions of the wetland are below the dam crest pool elevation.

Due to anticipated base level changes along the Little River and Little Buffalo Creek as a result of the dam removal, it is reasonable to ask whether dam removal will have an effect on these wetlands. In order to assess the potential effects of a base level drawdown, the Little Buffalo Creek riparian wetland system was studied and compared with a geomorphologically similar reference riparian wetland system at the confluence of Buffalo Creek and the Little River. Within each system, valley transect surveys, plant community descriptions, landform descriptions, photographic documentation, and detailed soil profile descriptions were completed.

The objectives of the study were to: 1) compare and contrast the physical and biological attributes of the study wetland system (Little Buffalo Creek) and reference wetland system (Buffalo Creek) and 2) catalogue anticipated changes in the study wetland system as a result of local river base level drawdown.

2.0 METHODS

Baseline natural resource information for the study was obtained through various sources, including U.S. Geologic Survey (USGS) topographic mapping (USGS Kenly West 7.5 minute quadrangle), USFWS National Wetlands Inventory (NWI) mapping, and Soil Conservation Service (SCS) soil survey (USDA 1994). Detailed topographic mapping to 1-foot contour intervals and aerial photography were provided by K2 Design. These resources were used for base mapping and evaluation of existing landscape and soil features prior to on-site evaluation.

Field investigations were performed in May 2005. Valley transect surveys were performed using a laser level and receiver, as well as 300-foot measuring tapes and a handheld GPS unit to determine stationing and geographic locations of each transect. Stream channel cross-sectional surveys were performed in accordance with Stream Channel Reference Sites: An Illustrated Guide to Field Technique (Harrelson, Rawlins, and Potyondy 1994).

Hand auger borings were performed by a North Carolina licensed soil scientist to provide detailed soil profile descriptions. Profile descriptions were compared with the Johnston County Soil Survey (USDA 1994) profile descriptions to confirm mapped soil series and inclusions.

When needed, plant species were determined using the Manual of the Vascular Flora of Carolinas (Radford, Ahles, and Bell 1968). Plant community assemblages were described using Classification of the Natural Communities of North Carolina (Schafale and Weakley 1990) as a reference. Landforms within each wetland area were described based on landscape position, plant community assemblages, relative elevations established from valley transect surveys, and soil profiles.

3.0 STUDY AND REFERENCE WETLAND DESCRIPTIONS

3.1 Study Area Locations and Watershed Descriptions

The approximate extents of the evaluated areas at both the study and reference riparian wetlands, as well as the surveyed valley transects and channel cross-sections, are shown on Figure 1 (Appendix A). Of specific interest to the study were the riparian wetland areas located at the mouths of Little Buffalo Creek and Buffalo Creek at the Little River. Riparian areas along each waterway upstream of their extents within the Little River floodplain (i.e., those areas generally unaffected by Little River flood events) were not evaluated.

Both study areas are located within the Upper Coastal Plain Physiographic Province of North Carolina. Buffalo Creek and Little Buffalo Creek, both tributaries of the Little River, are in the Neuse River Basin, within Hydrologic Unit #03020201. Little Buffalo Creek's headwaters are in

Johnston County in the vicinity of Stancils Chapel, approximately 7.5 miles north of the creek's confluence with the Little River. Buffalo Creek's headwaters are in Wake County, just south of Rolesville, approximately 29 miles northwest of its confluence with the Little River.

Although the Buffalo Creek watershed is considerably larger than Little Buffalo Creek's, land use within each watershed is similar. Forested and agricultural areas represent the largest land use categories within each watershed, with low density residential areas present to a lesser extent. There is minimal urbanization within each stream's watershed; however, Buffalo Creek drains the western portion of Wendell, NC.

3.2 NWI Mapping

NWI-mapped wetland areas within the study and reference wetland areas are shown on Figure 2 (Appendix A). Four NWI units are mapped within the Little Buffalo Creek wetland study area: **PFO1C, PFO1F, PSS1C,** and **PFO4/1A**. One NWI unit is mapped within the Buffalo Creek reference wetland area, **PFO1C**. The NWI uses Classification of Wetlands and Deepwater Habitats of the United States (USFWS 1979) to describe mapped wetland areas. NWI map units within the wetland areas are described below:

PFO1C: Palustrine, forested, broad-leaved deciduous, seasonally flooded

PFO1F: Palustrine, forested, broad-leaved deciduous, semipermanently flooded

PSS1C: Palustrine, scrub-shrub, broad-leaved deciduous, seasonally flooded

PFO4/1A: Palustrine, forested, needle-leaved evergreen/broad-leaved deciduous, temporarily flooded.

The main difference between the NWI-mapped wetland areas within the study and reference wetland sites is hydrologic regime. At the reference wetland site, wetland areas are described as "seasonally flooded," which means surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

In contrast, the hydrologic regime characteristic of the main NWI-mapped polygon within the study wetland area (PFO1F) along Little Buffalo Creek indicates flooding of longer duration. "Semipermanently flooded" areas are defined by the presence of surface water throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface. Adjacent "temporarily flooded" areas within the study wetland have surface water present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Plants that grow in both uplands and wetlands are characteristic of this regime. Please see Section 3.4 ("Hydrology") for additional discussion of hydrologic conditions at each wetland area.

3.3 Physiography and Geomorphology

3.3.1 Landscape Features and Valley Transects

Both the study and reference wetland areas occupy similar landscape positions. Each is located at the confluence of a major tributary, Little Buffalo Creek and Buffalo Creek, respectively, with the Little River. The valleys of each of these waterways are characterized by Valley Type VIII, as described by Rosgen (Rosgen 1996). Valley Type VIII is characterized by the presence of multiple river terraces situated along broad, gently sloping valley walls. Alluvial terraces and well-defined floodplains are the predominate landforms in Valley Type VIII.

Incorporating monitoring cross-sections established along the Little River, valley transects were surveyed at both the study and reference wetland areas. Transects were oriented perpendicular to the flow directions of both the Little River and major tributary (Little Buffalo Creek and Buffalo Creek) at each site. Thus, each transect has a straight, perpendicular traverse across the Little River before changing direction to perpendicularly intersect each tributary's valley at both wetland sites.

Transect surveys indicate similar landscape features, and their accompanying relative elevations, at each site (Figures 3 and 4, Appendix A). Four general landscape features were observed at both wetland areas: Little River levee, backwater slough, Little River floodplain/tributary terrace, and tributary floodplain. In addition to these four landforms, a low terrace was observed at the Little Buffalo Creek study wetland. Also, an area of fill material was observed between the backwater slough and Little River floodplain landforms at the Buffalo Creek reference wetland.

A natural levee is adjacent to the Little River banks at both wetland sites. The levee is approximately 1.5—3.5 feet higher than the Little River's bankfull elevation at each site. The levee slopes downward to a backwater slough area, which is better defined at the Buffalo Creek reference wetland. From the backwater slough, the landscape slopes slightly upwards towards the Little River floodplain, which doubles as a terrace for the major tributary at each wetland site. The elevation of the Little River/tributary terrace feature is consistent with the Little River bankfull elevation at both sites. The Little River floodplain/tributary terrace slopes downwards towards the major tributary floodplain at each site. Buffalo Creek's floodplain is approximately 2 feet below the elevation of the Little River floodplain/tributary terrace at the reference wetland, and Little Buffalo Creek's floodplain and 4 feet below the Little River floodplain/tributary terrace at the study wetland. An additional landform, a low terrace approximately 1 foot lower in elevation than the Little River floodplain/tributary terrace, was also observed across Little Buffalo Creek's floodplain.

Portions of the Little Buffalo Creek floodplain are inundated within the study wetland area. The cause of inundation appears to be primarily attributable to two factors: 1) hydrologic influence from the dam crest pool, and 2) an oxbow feature formed by a meander cutoff of the Little River that perpendicularly intercepts the Little Buffalo Creek floodplain.

3.3.2 Stream Channel Descriptions

The Little River is best described as an E5 stream channel per Rosgen classification (Rosgen 1996). E-type channels are characterized by relatively low bankfull width to depth ratios, relatively high sinuosity, and sandy substrate. Within and upstream of the reference wetland area, Buffalo Creek is also an E5 channel. Due to inundation within the study wetland area, there was no observable, defined reach of Little Buffalo Creek to classify. However, upstream of the study wetland area, Little Buffalo Creek also exhibits E5 channel characteristics.

3.4 Hydrology

A conceptual water budget (modeled after water budgets developed for similar wetland types in Mitsch and Gosselink 1993) for both the study and reference riparian wetlands is shown in Figure 5 (Appendix A). Arrows pointing towards the wetland system indicate hydrologic inputs; arrows pointing away from the system indicate outflows. At the Buffalo Creek reference wetland, major hydrologic inputs include precipitation, which averages 48 inches annually in Johnston County (USDA 1994), surface water inflow as a result of flooding from both the Little River and Buffalo Creek, and groundwater inflow. Major outflows include surface outflow, evapotranspiration, canopy interception, and groundwater outflow.

The Little Buffalo Creek study wetland has a similar conceptual water budget. However, since portions of the wetland remain semipermanently flooded due to influence from the dam crest pool and the Little River oxbow that intercepts the Little Buffalo Creek floodplain, surface water is retained to a much greater degree at the study wetland than at the reference wetland.

3.5 Geology and Soils

3.5.1 Geology

The site is located in a geologically complex area near the convergence of the Upper Coastal Plain and Piedmont physiographic provinces of North Carolina. The area is underlain by the Eastern Slate Belt, which is composed of slightly metamorphosed volcanic and sedimentary rocks (Horton Jr. and Zullos [eds.] 1991). Marine sediments of varying depths overlie these rocks. Rocks characteristic of this geologic region include gneiss, schist, phyllite, metagraywacke, siltstone, and mudstone. Area soils reflect the region's geologic complexity, and include series typically associated with the Coastal Plain (Norfolk, Goldsboro, Lynchburg, Rains series) and the Piedmont (Cecil, Wedowee, Pacolet, Nason series).

3.5.2 Soil Mapping Units and Series Descriptions

Mapped soil units within the study and reference wetland areas are shown on Figure 6 (Appendix A). Mapping units and soil series are described below:

AaA—Altavista fine sandy loam, 0 to 2 percent slopes, occasionally flooded: This moderately well drained soil, formed in fluvial sediments, is found on stream terraces and low ridges. A typical profile consists of an approximate 7 to 11 inch thick fine sandy loam surface horizon underlain by clay loam subsoil that gives way to sandy loam parent material at an approximate 47 inch depth. The thickness of the solum ranges from 30 to more than 60 inches. Altavista soils are moderately to extremely acid throughout the profile.

Included within this mapping unit are small areas of the Augusta and State series. Augusta soils, found in depressions, are somewhat poorly drained. State soils are found along higher terraces and are well drained.

NnD—Nason silt loam, 8 to 15 percent slopes: The Nason series consists of deep, well drained soils formed in weathered slate and phyllite. Nason soils are found along south-facing side slopes of stream valleys in uplands. A typical profile consists of an approximate 4 inch thick silt loam surface horizon underlain by silty clay subsoil that gives way to weathered parent material at an approximate 45 inch depth.

Included within the Nason silt loam mapping unit are small areas of soils that are less than 40 inches deep over bedrock, soils that have a surface layer of sandy loam or gravelly sandy loam, and soils that have less clay in the subsoil than is typical for the Nason series.

To—Tomotley sandy loam, rarely flooded: This poorly drained soil is found on low stream terraces in the Coastal Plain. Tomotley soils formed in loamy fluvial sediments. A typical profile consists of an approximate 8 inch thick sandy loam surface horizon underlain by approximately 22 inches of sandy clay loam subsoil that gives way to sandy parent material at an approximate 40 inch depth.

Mapped inclusions in this unit include Augusta, Roanoke, Wedhadkee, and Pantego series. Augusta soils are mapped in slightly higher areas and are somewhat poorly drained. Roanoke soils, though found in similar landscape positions as Tomotley soils, have a higher proportion of clay in the subsoil. Wedhadkee soils are found on floodplains and are typically frequently flooded. Pantego soils are very poorly drained and have an umbric (black) surface.

Wt—Wehadkee loam, frequently flooded: This nearly level, poorly drained soil is found on floodplains. Wedhadkee soils formed in recently deposited alluvial sediments. A typical Wedhadkee profile consists of an approximate 7-inch thick loamy surface horizon underlain by appxoximately 42 inches of clay loam subsoil that gives way to clay loam parent material at 49 inches.

Included within the Wehadkee loam mapping unit are small areas of the somewhat poorly drained Chewacla series, which is found in similar landscape positions as Wedhadkee. Also included are small areas of very poorly drained soils with umbric surfaces that occur in depressions within the floodplain.

3.5.2 Soil Profile Descriptions

Hand auger borings were performed in each wetland area to verify mapped soil series and qualitatively assess soil moisture conditions based on morphologic properties. Borings were performed on each landscape position described above in Section 3.3.1 (“Landscape Features and Valley Transects”). Detailed profile descriptions are in Appendix A.

Soil boring locations within the Little Buffalo Creek study wetland site are all located within the **Wt** mapping unit (Wehadkee) per the Johnston County Soil Survey. Soil profiles in the

backwater slough and low terrace landforms were consistent with the Wehadkee series. However, soil profiles described in the levee and Little River floodplain/tributary terrace landforms better resembled the Altavista series, which is mapped nearby. Due to flooded conditions, a soil boring was not performed in the Little Buffalo Creek floodplain. Soils within the floodplain are expected to resemble the Wedhadkee series with a veneer of sediment overlaying the typical soil profile.

Soil borings are also all located within the **Wt** mapping unit at the Buffalo Creek reference wetland site. Soil profiles described in the backwater slough and Buffalo Creek floodplain resembled the Wedhadkee series. However, borings taken in the Little River levee and Little Buffalo Creek/tributary terrace landforms also resembled the Altavista series, as was the case at the study wetland site.

3.6 Plant Community Assemblages

Plant communities on each landform described in Section 3.3.1 ("Landscape Features and Valley Transects) at each wetland were observed and species lists were recorded for each vegetative stratum (tree/canopy, shrub/understory, herbaceous, and vine). An additional community assemblage was described along the banks of the Little River at each wetland (streamside assemblage). Species lists by stratum for each plant community assemblage at both wetlands are listed in Appendix B.

In general, similar species were observed in the streamside assemblage and levee plant communities at both wetlands. At both sites, sedge (*Carex* spp.) and knotweed (*Polygonum* spp.) shared dominance in the streamside assemblage herbaceous stratum. The tree stratum was not well developed at either site in the streamside assemblage, with only sparse green ash (*Fraxinus pennsylvanica*) individuals observed at the study wetland. Greenbrier (*Smilax rotundifolia*) and Japanese honeysuckle (*Lonicera japonica*) were dense at both sites in the streamside assemblage.

Various hardwoods occupied the tree stratum in the levee community at both sites, including American elm (*Ulmus americana*), river birch (*Betula nigra*), red maple (*Acer rubrum*), and overcup oak (*Quercus lyrata*). Loblolly pine (*Pinus* taeda) was also observed in the tree stratum in the levee community at the study wetland, as well as water oak (*Quercus nigra*), and white oak (*Quercus alba*). Hawthorn (*Crataegus* spp.) and sycamore (*Platanus occidentalis*) were observed in the tree stratum in the levee community at the reference wetland. Muscadine (*Vitis rotundifolia*) was present in the vine stratum at each wetland. With the exception of sparse jewelweed (*Impatiens capensis*) observed at the reference wetland, the herbaceous stratum was undeveloped at both sites in the levee community.

Sparse, mature hardwoods characterize the tree stratum in the backwater slough community at the reference wetland, including green ash, red maple, river birch, American elm, and musclewood (*Carpinus caroliniana*). Due to what appeared to be frequently saturated and/or flooded conditions (with accompanying hydric soil conditions—see backwater slough profile description in Appendix A), both the shrub and herbaceous strata were underdeveloped.
In contrast, dense tree and shrub strata characterized the backwater slough community in the study wetland. Red maple, green ash, river birch, willow oak (*Quercus phellos*), American elm,

overcup oak, and musclewood were present in the diverse tree stratum, while titi (*Cyrilla racemiflora*), giant cane (*Arundinaria gigantea*), and water tupelo (*Nyssa biflora*) occupied the shrub stratum. Greenbrier was the only vine observed in the vine stratum at both wetlands.

The Little River floodplain/tributary terrace communities contrasted strongly between the study and reference wetlands. A highly diverse tree stratum, including red maple, musclewood, laurel oak (*Quercus laurifolia*), water oak, swamp chestnut oak (*Quercus michauxii*), sweetgum (*Liquidambar styraciflua*), northern red oak (*Quercus rubra*), loblolly pine, willow oak, American holly (*Ilex opaca*), and winged elm (*Ulmus alata*) comprised the tree stratum at the reference wetland. Giant cane, highbush blueberry (*Vaccinium corymbosum*), horse sugar (*Symplocos tinctoria*), and spicebush (*Lindera benzoin*) occupied the shrub stratum, while poison ivy (*Toxicodendron radicans*), muscadine, and greenbrier formed the vine stratum. The herbaceous stratum was undeveloped in the reference wetland Little River floodplain/tributary terrace community.

In contrast, only three species (red maple, willow oak, and river birch) comprised the tree stratum in the study wetland Little River floodplain/tributary terrace community. Species in the shrub stratum were identical to those observed in the backwater slough community (titi, water tupelo, and giant cane). Both the herbaceous and vine strata were undeveloped.

The tributary floodplain communities also contrasted sharply between the two wetlands, primarily due to inundation within the Little Buffalo Creek floodplain. In the Little Buffalo Creek floodplain, small (less than 20 feet in diameter) islands have formed around old bald cypress (*Taxodium distichum*) stumps, supporting midsize (less than 15 feet tall) green ash saplings, as well as sparse *Carex* spp. clumps.

In comparison, diverse hardwoods were observed in the tree stratum on the Buffalo Creek floodplain, including swamp chestnut oak, red maple, green ash, water tupelo, overcup oak, laurel oak, willow oak, and sweetgum. Winterberry (*Ilex verticillata*) and American holly comprised the shrub stratum, while netted chainfern (*Woodwardia areolata*), lizard's tail (*Saururus cernuus*), and violet (*Viola* spp.) occupied the herbaceous stratum. No vines were observed within the Buffalo Creek floodplain.

Adjacent to the far end of the Little Buffalo Creek floodplain opposite the Little River floodplain/tributary terrace (which rises from the near end of the Little Buffalo Creek floodplain) is a low terrace that was saturated at the time of fieldwork. The terrace is approximately 2 feet lower in elevation than the Little River floodplain/tributary terrace landform. This area is best described as a gum swamp, with water tupelo, red maple, and green ash occupying the tree stratum. Shrubs and vines were absent, but marsh dewflower (*Murdania keisak*) blanketed the swamp floor, with pennywort (*Hydrocotyle umbellata*), *Carex* spp., and knotweed (*Polygonum* spp.) present to a lesser extent.

Abutting the low terrace at the same elevation is a large, recently logged area. Soil saturation and occasional inundated areas persist all the way to the valley escarpment (observable from Highway 301) to the north of the Little River. Numerous beaver dams, which appear to be

controlling local hydrology, and evidence of beaver activity were observed within this area. Due to flooded conditions, tall trees are rare, but sweetgum and red maple saplings are abundant.

4.0 DISCUSSION

4.1 Wetland System Comparison

Both the study and reference wetlands occupy similar landscape positions, and have both been affected by the same historic, formative geomorphological processes. Each is at the confluence of the Little River with a major tributary, although Buffalo Creek's watershed size is substantially larger than Little Buffalo Creek's.

As observed in the field and measured in valley transect surveys, both wetland systems have similar landforms and relative elevations accompanying each landform. Immediately adjacent to the Little River banks at each site is a natural levee that is approximately 1.5 feet higher in elevation than the river bankfull stage. The levee slopes down approximately 4 feet to a backwater slough that rises to the Little River floodplain/tributary terrace feature. The landscape then slopes 2 to 5 feet downward to each tributary's floodplain. An additional landscape feature, a low terrace, was observed at the Little Buffalo Creek study wetland site.

The predominate soil mapping unit at both wetlands is **Wt**, Wehadkee loam (USDA 1994). Hand auger borings taken within the backwater slough areas at both wetland sites were consistent with the USDA Wehadkee profile description. Auger borings taken within the Little River Floodplain/tributary terrace landform at both sites, although mapped Wedhadkee, were more consistent with the Altavista series, a moderately well drained terrace soil. The discrepancy between the mapped soil (Wehadkee) and profile descriptions is probably attributable to microtopographical variation within the Little River floodplain/tributary terrace landform, as Wehadkee is expected to be the predominate Little River floodplain soil series in both areas. A hand auger boring taken within the Buffalo Creek floodplain was consistent with the Wehadkee series. Although a soil boring was not taken in the Little Buffalo Creek floodplain due to flooded conditions, soils are likely to be consistent with the Wehadkee series (with a veneer of sediment overlaying the soil profile) due to persistent anaerobic conditions.

Vegetative communities described at each landform at both wetland sites varied considerably. At both wetlands, various hardwood species occupied the tree stratum within the levee community, while the herbaceous stratum was sparse. Due to what appeared to be frequently saturated and/or ponded conditions, the backwater slough community, with the exception of a few larger hardwoods, was sparse at the Buffalo Creek reference wetland when compared to the dense tree and shrub strata observed at the Little Buffalo Creek study wetland.

Diverse hardwood characterized the tree stratum at the reference wetland Little River floodplain/tributary terrace community. Species diversity within the tree stratum was much lower in the same community at the study wetland. Due primarily to the inundated conditions characteristic of the Little Buffalo Creek floodplain within the study wetland, vegetative composition within the tributary floodplain community contrasted sharply between the two wetlands. Diverse hardwoods characterized the Buffalo Creek floodplain, while sparse green

ash saplings and clumps of *Carex* spp. sprouting from old bald cypress stumps represented the Little Buffalo Creek floodplain community. Water tupelo, red maple, and green ash comprised the tree stratum at the low terrace community at the Little Buffalo Creek wetland, a landform not observed within the Buffalo Creek reference wetland.

4.2 Anticipated Changes in the Little Buffalo Creek Wetland System

Since elevations in some areas within the Little Buffalo Creek wetland are at or below the 131 feet MSL elevation of the Lowell Mill Dam crest pool, there is some justification for postulating some effect or impact to the wetlands when the dam is removed. Although inundated areas within the Little Buffalo Creek floodplain indicate potential influence from the crest pool, field observation and data collected for the purposes of this study suggest that rather than a loss of wetland area, changes in hydrologic regime, plant community structure, and wetland function are anticipated for the Little Buffalo Creek wetland area. These changes are expected to shift the edaphic and biotic conditions present at the Little Buffalo Creek wetland towards conditions characteristic of the Buffalo Creek reference wetland once the dam is removed and the historic, natural hydroperiod is restored to the wetlands adjacent to Little Buffalo Creek.

In its current state, the main portions of Little Buffalo Creek wetland, particularly the creek's floodplain, resemble a Coastal Plain Semipermanent Impoundment (Schafale and Weakley 1990). These communities are characterized by nearly constant flooded conditions and generally sparse woody vegetation, which may include bald cypress and water tupelo. Hydrologic modification by beaver is commonplace, and beaver activity was observed in the area during the field investigation.

In contrast, the Buffalo Creek reference wetland is best described as a Coastal Plain Bottomland Harwood (Brownwater Subtype) (Schafale and Weakley 1990). Diverse hardwoods comprise the canopy and understory in these areas, while the herbaceous stratum is typically sparse. These areas are occasionally flooded, and consequently have much flashier hydroperiods than Coastal Plain Semipermanent Impoundments.

Although often esthetically pleasing, Coastal Plain Semipermanent Impoundments, due to their characteristically long hydroperiods, lack the flooding/"drying out" hydrologic signature associated with bottomland hardwood forests similar to the Buffalo Creek reference wetland. Variable flooding creates cyclical aerobic/anaerobic soil conditions that give bottomland hardwood forests unique, beneficial biogeochemical dynamics.

Anaerobiosis influences soil pH, which causes mobilization of several nutrients, including phosphorous, nitrogen, magnesium, sulfur, manganense, iron, boron, copper, and zinc (Mitsch and Gosselink 1993), potentially leading to greater plant availability of these nutrients. Denitirifcation, in which nitrate (NO_3^-) is converted to nitrous oxide (N_2O) and/or nitrogen gas (N_2), subsequently volatilizing each gas into the atmosphere, is another benefit of anaerobic soil conditions. Aerobic soil conditions catalyze equally beneficial chemical processes. Nitification is one such process, in which ammonium (NH_4^+) is converted to nitrite (NO_2^-) and then plant-available nitrate by *Nitrosomonas* and *Nitrobacter* bacteria, respectively. While aerobic and anaerobic soil conditions each produce uniquely beneficial biogeochemical processes, it is the periodic wetting and drying of bottomland hardwood forest wetlands that enable these systems

to benefit from both. Thus is the case in the Buffalo Creek reference wetland, while the Little Buffalo Creek study wetland is influenced primarily by continuous anaerobic soil conditions as a result of semipermanent inundation.

Alternating wet and dry periods also have ramifications for ecosystem structure, biodiversity, productivity, and wildlife habitat. Bottomland hardwood forest wetlands, similar to the Buffalo Creek reference wetland, are characterized by highly diverse trees adapted to a wide variety of environmental conditions induced by periodic flooding (Mitsch and Gosselink 1993). Semipermanently flooded conditions characteristic of the Little Buffalo Creek wetland support lower vegetative species diversity, since fewer species are tolerant of near constant anaerobic soil conditions. Alternating wet/dry soil conditions also affect primary productivity. Net biomass production (litterfall + stem growth) is typically greater in wetland areas with an alternating aerobic/anaerobic cycle than in semipermanently flooded wetland systems (Mitsch and Gosselink 1993). Since riparian wetlands constitute the interface between aquatic and terrestrial systems, the ecological principle of edge effect is manifested in the inherent high diversity of animal species in riparian areas. Species diversity and abundance tend to be highest at the confluence of two distinct ecological systems, such as aquatic and upland systems (Mitsch and Gosselink 1993). Although both the Buffalo Creek and Little Buffalo Creek wetland systems both likely benefit from edge effect, the latter system, in its current hydrologic condition, is more closely associated with an aquatic ecosystem. This precludes terrestrial species utilization to the same degree that is likely the case at the Buffalo Creek reference wetland.

Although hydrologic conditions within the Little Buffalo Creek wetland are expected to shift towards those characteristic of the Buffalo Creek reference wetland as a result of the Lowell Mill dam removal project, two factors will continue to influence local hydrology: beaver activity and what appears to be a Little River oxbow feature perpendicularly intersecting the Little Buffalo Creek floodplain within the study area. Numerous beaver dams, two large lodges, and beaver-chewed sticks were observed during the field investigation. A large, recently logged area adjacent to the study wetland remains saturated and partially ponded as a result of beaver activity. As observed from Highway 301, this area persists north to the first major topographic incline associated with the Little River valley escarpment. The Little River provides a corridor by which beaver can continuously access Little Buffalo Creek. Beaver are expected to continue to dam up portions of the Little Buffalo Creek floodplain following dam removal, resulting in localized flooded areas. What appears to be an old Little River meander cutoff/oxbow cuts perpendicularly across the Little Buffalo Creek floodplain. Although no water depth measurements were taken within this area, ground elevations are probably lower in this feature than the adjacent, inundated natural grade, indicating it will likely remain ponded, or at least perennially saturated, after dam removal.

4.3 Conversion of Open Water Areas to Wetlands

Although portions of the Little Buffalo Creek floodplain constitute the largest, contiguous open water area potentially influenced by the crest pool elevation of 131 feet MSL, there are several other projected open water areas (based on elevation) at or below 131 feet MSL adjacent to the Little River. These areas are displayed on Figure 7 (Appendix A). In addition, areas that are

potentially hydrologically influenced by the crest pool, between 131 and 132 feet MSL, are displayed.

As discussed in Section 4.2 (“Anticipated Changes in the Little Buffalo Creek Wetland System”), open water areas are expected to functionally shift towards bottomland hardwood forest wetlands upon the dam’s removal and subsequent drop in the Little River stage, effectively resulting in wetland creation. Concerns have been raised that despite this wetland creation, the potential draining of previously upland areas that may have been converted into jurisdictional wetlands as a result of the impoundment (i.e., those areas between 131 and 132 feet MSL) upon the dam’s removal will result in a net loss of wetlands. As displayed in Figure 7 (Appendix A), projected open water areas at or below 131 feet MSL occupy substantially more area than fringe areas between 131 and 132 feet MSL potentially hydrologically influenced by the impoundment. Thus, the Lowell Mill Dam removal may result in a net increase in wetland area.

5.0 REFERENCES

Horton Jr., J. W. and Zullo, V. A. (eds.). 1991. The Geology of the Carolinas: Carolina Geological Society Fiftieth Anniversary Volume. The University of Tennessee Press. Knoxville, TN.

Mitsch, W.J. and Gosselink, J.G. 1993. Wetlands—2nd ed. John Wiley & Sons, In. New York, NY.

Rosgen D. 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado.

Harrelson, C. C., Rawlins, C. L. and Potyondy, J. P. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. Gen. Tech. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rock Mountain Forest and Range Experiment Station. 61 p.

North Carolina Dam Removal Task Force (NCDRTF). 2001 (unpublished). Interagency Memorandum of Agreement for Dam Removal and Dam Removal Ranking System. U.S. Fish and Wildlife Service. Raleigh, North Carolina.

Radford, A. E., Ahles, H. E. and Bell, C. R. 1968. Manual of the Vascular Flora of the Carolinas. The University of North Carolina Press. Chapel Hill, NC.

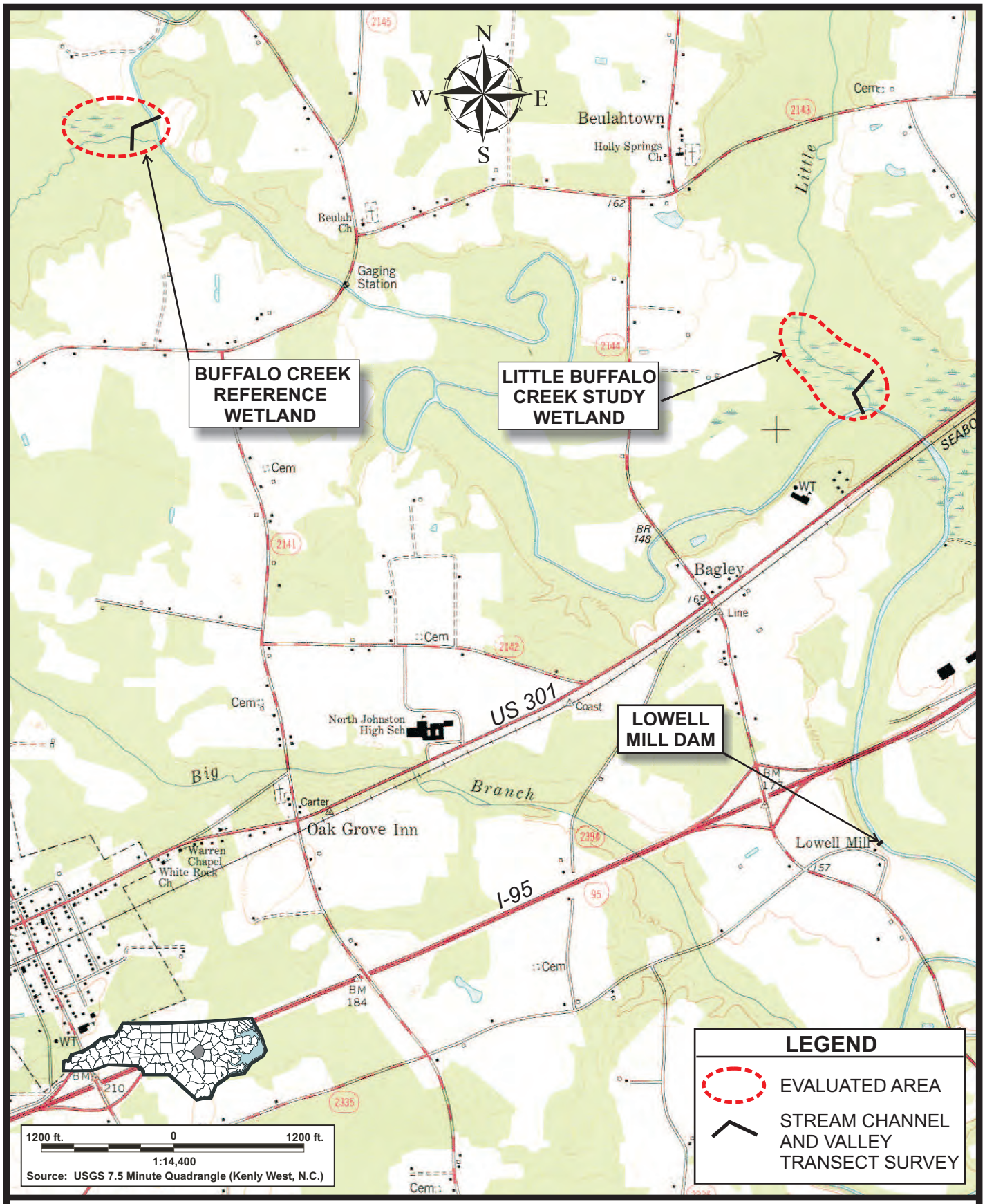
Schafale, M. P. and Weakley, A. S. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, N.C. Department of Environment, Health, and Natural Resources. Raleigh, NC.

United States Department of Agriculture (USDA). 1994. Soil Survey of Johnston County, North Carolina. Soil Conservation Service.

United States Fish and Wildlife Service (USFWS). 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior.

APPENDIX A

FIGURES



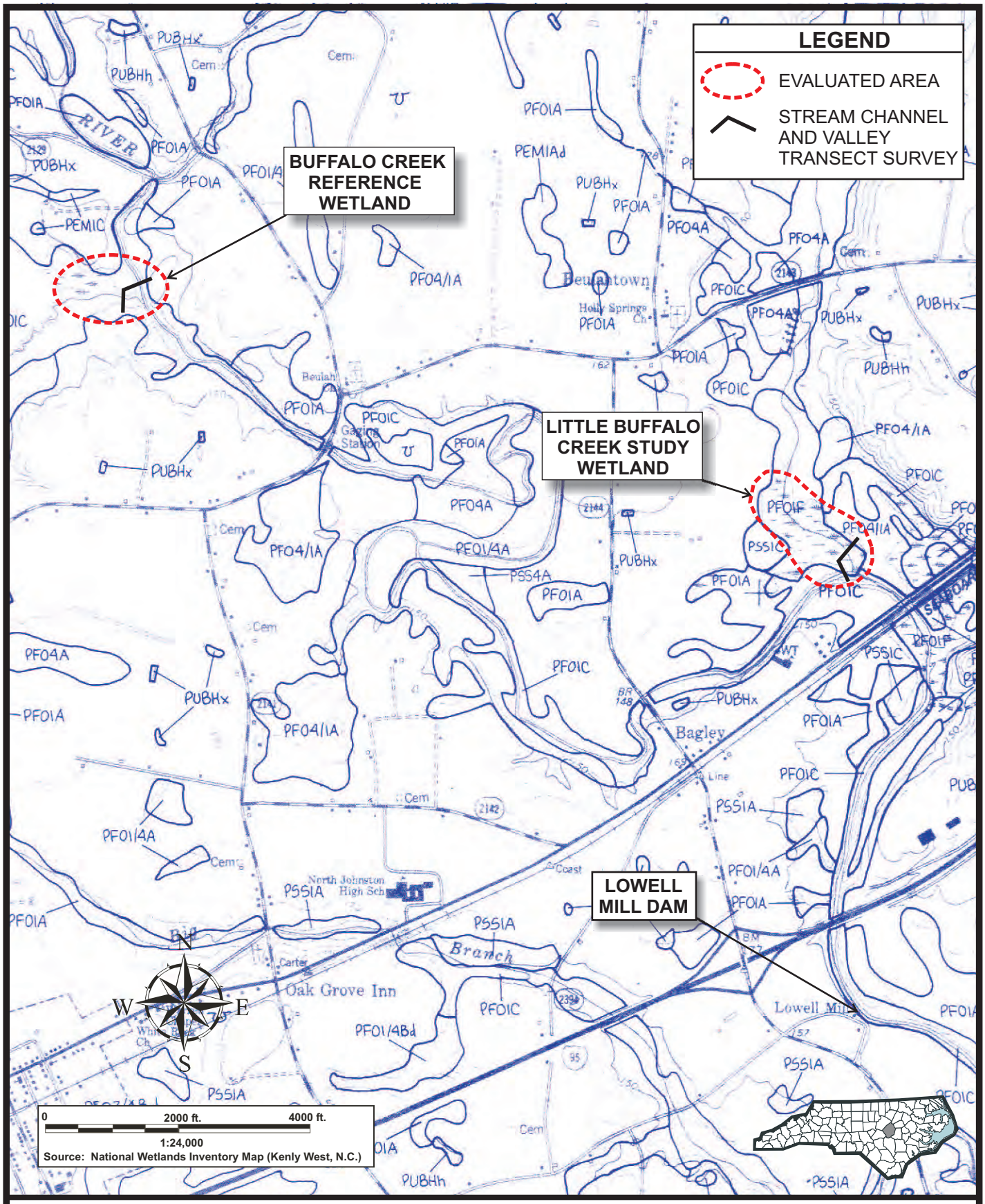
EcoScience Corporation
Raleigh, North Carolina

USGS SITE VICINITY MAP
Lowell Mill Wetland Study

Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JDC
Date:	JUN 2005
Project:	05-242.02

FIGURE 1

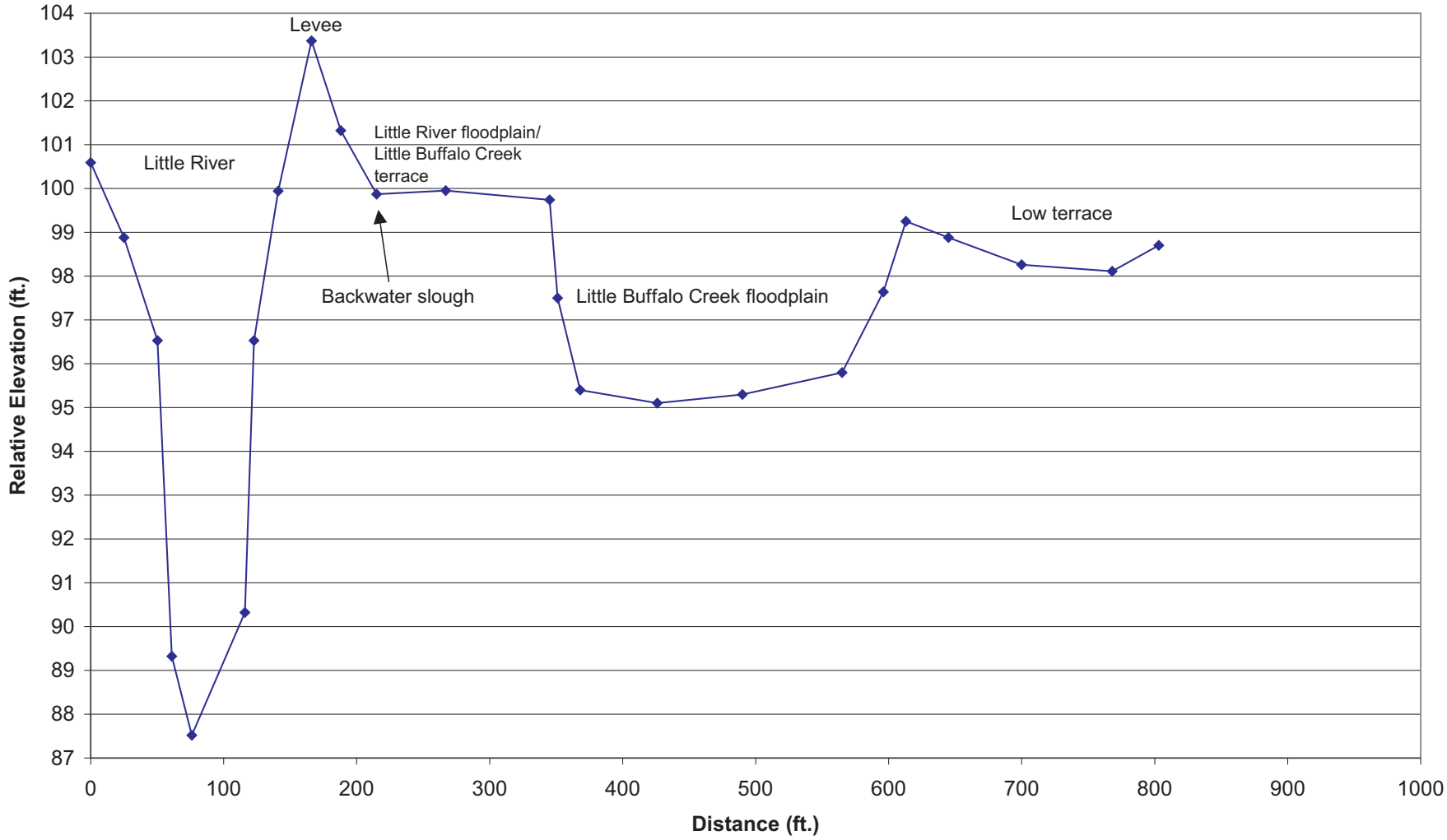


EcoScience Corporation
Raleigh, North Carolina

NWI MAPPING
Lowell Mill Wetland Study
Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JDC
Date:	JUN 2005
Project:	05-242.02

FIGURE 2

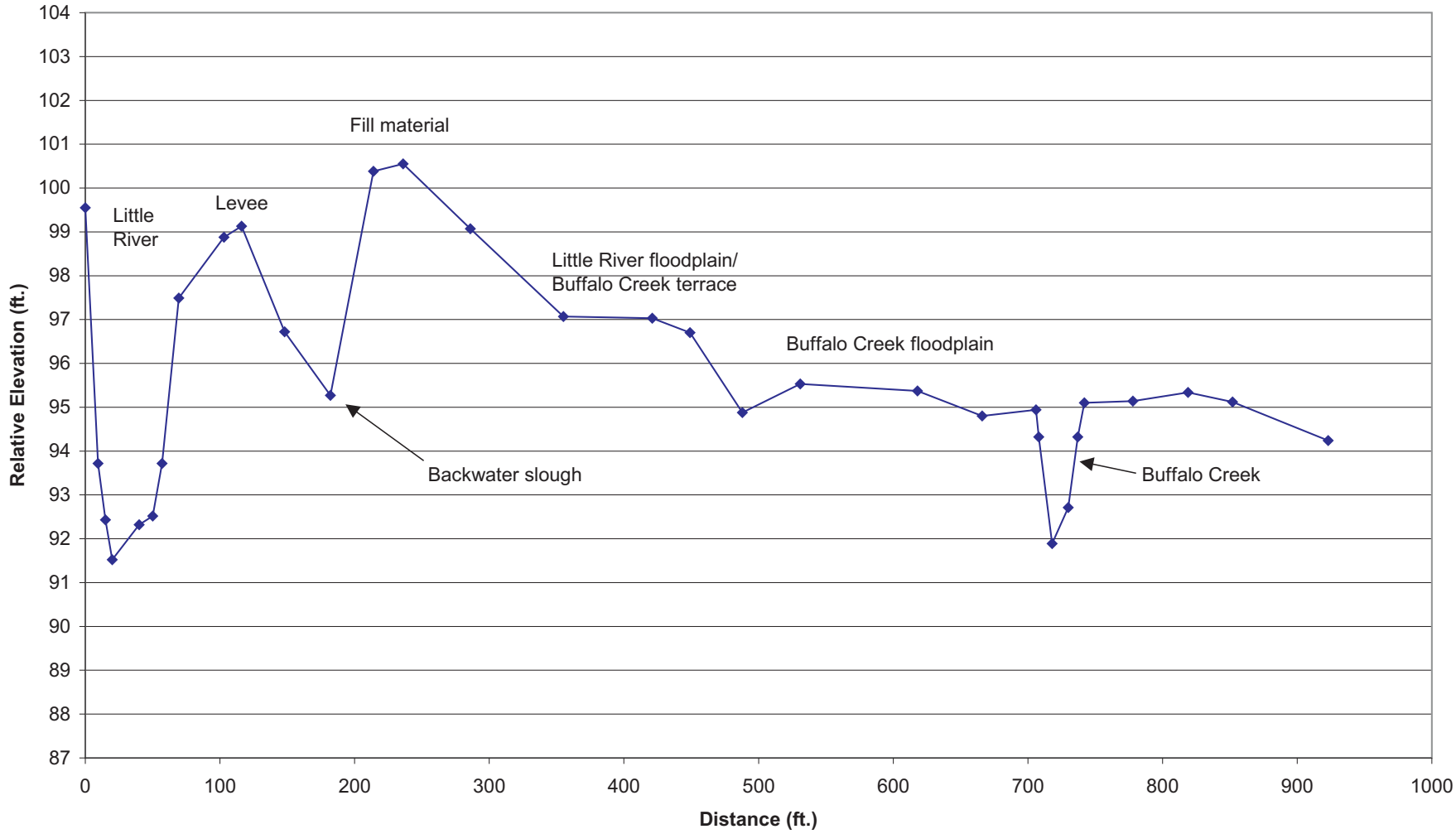


EcoScience Corporation
Raleigh, North Carolina

LITTLE BUFFALO CREEK VALLEY TRANSECT
Lowell Mill Wetland Study
Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JDC
Date:	JUN 2005
Project:	05-242

FIGURE 3

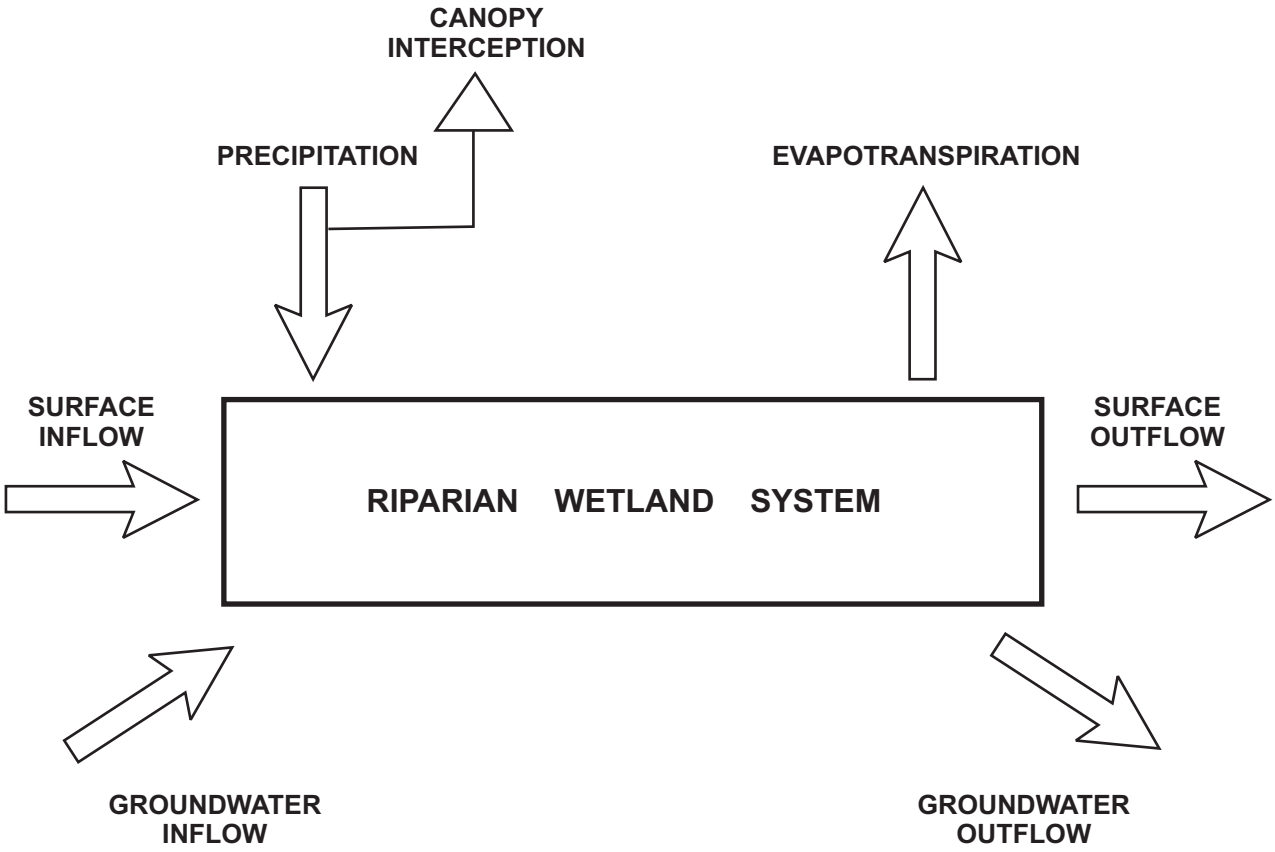


EcoScience Corporation
Raleigh, North Carolina

BUFFALO CREEK VALLEY TRANSECT
Lowell Mill Wetland Study
Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JDC
Date:	JUN 2005
Project:	05-242

FIGURE
4

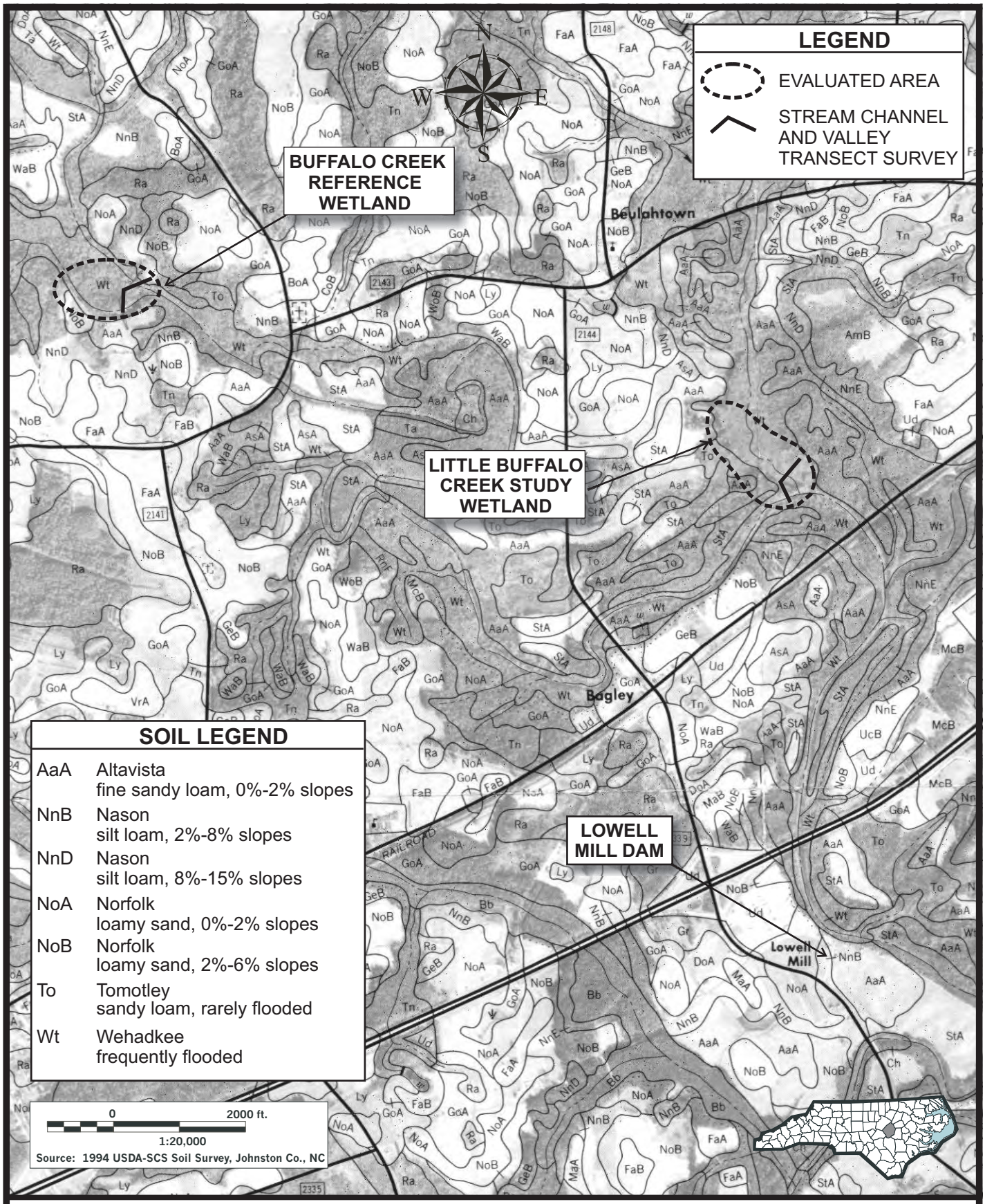


EcoScience Corporation
Raleigh, North Carolina

RIPARIAN WETLAND SYSTEM
CONCEPTUAL WATER BUDGET
Lowell Mill Wetland Study
Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JDC
Date:	JUN 2005
Project:	05-242.02

FIGURE
5



EcoScience Corporation
Raleigh, North Carolina

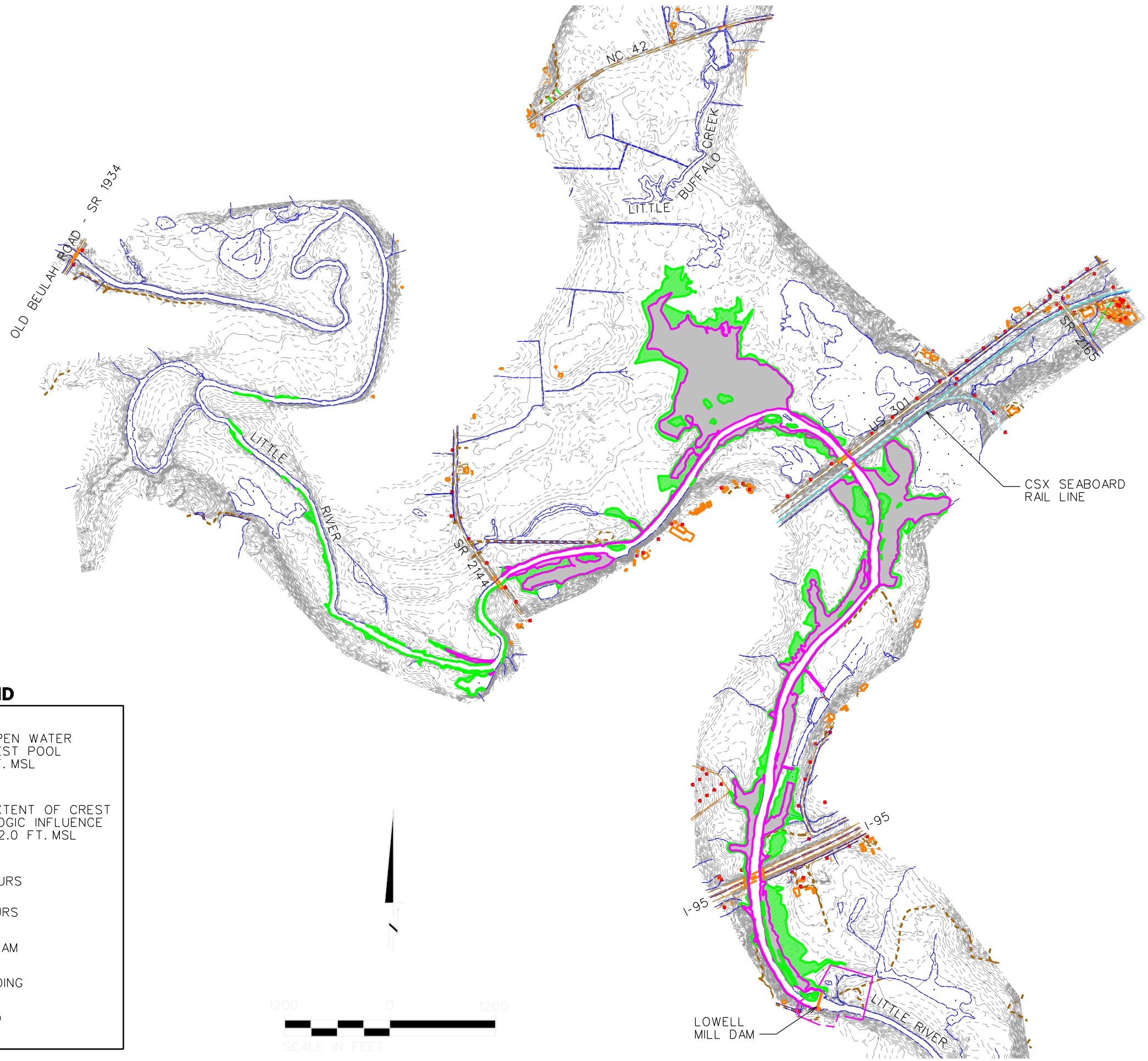
JOHNSTON COUNTY SOIL SURVEY MAP

Lowell Mill Wetland Study

Johnston County, North Carolina

Dwn. by:	MAF
Ckd by:	JDC
Date:	JUN 2005
Project:	05-242.02

FIGURE 6



LEGEND

- PROJECTED OPEN WATER AREAS AT CREST POOL ELEV.=131.0 FT. MSL (66.0± acres)
- PROJECTED EXTENT OF CREST POOL HYDROLOGIC INFLUENCE ELEV.=131.0-132.0 FT. MSL (39.0± acres)
- —140— MAJOR CONTOURS
- ------ MINOR CONTOURS
- ------- EXISTING STREAM
- EXISTING BUILDING
- ======= EXISTING ROAD

EcoScience Corporation
Raleigh, North Carolina

REVISIONS

Client: Ecosystem Enhancement Program

Project:

LOWELL MILL WETLAND STUDY

JOHNSTON COUNTY, NORTH CAROLINA

Title:

POTENTIAL HYDROLOGIC INFLUENCE OF DAM CREST POOL

Dwn By:	Date:
MAF	JUL 2005
Ckd By:	Scale:
JWG	1"=1200'

ESC Project No.: 05-242

FIGURE

7

APPENDIX B

SOIL PROFILE DESCRIPTIONS

Little Buffalo Creek Study Wetland Soil Profile Descriptions

Boring 1 - levee
Altavista series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
0--4	A	loam	10YR 4/3			
4--24	Bt1	clay loam	10YR 5/6			
24--48+	Bt2	clay loam	10YR 5/6	10YR 5/2	few, distinct	

Boring 2 - backwater slough
Wehadkee series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
0--6	A	loam	10YR 3/2	5YR 4/6	common, distinct	
6--20	Bt1	sandy clay	10YR 6/1	5YR 4/6	abundant, prominent	
20--36	Bg	sandy clay	5/5GY			
36--48+	Cg	sandy clay loam	5/5GY			

Boring 3 - Little River floodplain/tributary terrace
Altavista series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
0--4	A1	loam	10YR 4/2			
4--11	E	loam	10YR 5/3	10YR 5/8	few, prominent	
11--32	Bt1	clay loam	10YR 5/6 + 10YR 5/2			mixed matrix
32--37	Bt2	clay loam	10YR 5/6	5/5GY	abundant, prominent	
37--45	Bt3	clay loam	10YR 4/3	5/5GY	abundant, prominent	
45-48+	Cg	sandy clay	5/5GY			water @ 48"

Boring 4 - low terrace
Wehadkee series

depth (in)	horizon	texture	color	color	desc.	note
0--6	A	silty loam	10YR 3/2			
6--14	Bt1	silty clay	10YR 4/1	10YR 3/6	common, distinct	water @ 12"
14--24	Bt2	silty clay	10YR 5/1			
24--48+	Bt3	clay	6/N	10YR 5/8	abundant, prominent	

Buffalo Creek Reference Wetland Soil Profile Descriptions

Boring 1 - levee
Altvavista series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
0--2	A	loam	10YR 4/2			
2--32	A\E	loam	10YR 5/4	10YR 5/2	few, faint	
32--37	Bt	clay loam	10YR 5/1	10YR 5/3	many, faint	
37--47	C1	sandy loam	10YR 6/2	10 YR 6/4	many, faint	
47--48+	C2	sandy clay loam	10YR 6/2	7.5YR 5/8	few, prominent	

Boring 2 - backwater slough
Wehadkee series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
1--0	Oi					
0--2	A	loam	10YR 4/2			
2--4	Bt1	clay loam	10YR 5/3	10YR 5/6	few, prominent	
4--13	Bt2	clay loam	10YR 5/1	10YR 5/6	few, prominent	
13--26	Bt3	silty clay	10YR 5/1	10YR 5/8	few, prominent	
26--48+	Bt4	silty clay	10YR 5/1			

Boring 3 - Little River floodplain/tributary terrace
Altavista series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
0--6	A	loam	10YR 3/2			
6--19	Bt1	clay loam	10YR 5/4			
19--31	Bt2	clay loam	10YR 5/6 + 10YR 5/3			mixed matrix
31--48+	C	sandy loam	10YR 5/4			abundant, rounded siliceous gravel

Boring 4 - tributary floodplain
Wehadkee series

depth (in)	horizon	texture	matrix color	mottle color	mottle desc.	note
1--0	Oi					
0--6	A	loam	10YR 5/3			
6--11	Bt1	clay loam	10YR 5/2	7.5YR 5/8	common, distinct	
11--40	Bt2	clay	10YR 6/1	7.5YR 5/8	common, distinct	water @ 36"
40--48+	C	loamy sand	10YR 7/1			

APPENDIX C

PLANT COMMUNITY SPECIES LISTS

Landform/ Community Assemblage:	Little Buffalo Creek	Buffalo Creek
Little River Floodplain/ Tribuary Terrace	**trees:** *Acer rubrum* *Quercus phellos* *Betula nigra* **shrubs:** *Cyrilla racemiflora* *Nyssa biflora* *Arundinaria gigantea* **herbs:** N/A **vines:** N/A	**trees:** *Acer rubrum* *Carpinus caroliniana* *Quercus laurifolia* *Quercus nigra* *Quercus michauxii* *Crataegus spp.* *Liquidambar styraciflua* *Quercus rubra* *Pinus taeda* *Quercus phellos* *Ilex opaca* *Ulmus alata* **shrubs:** *Arundinaria gigantea* *Vaccinium corymbosum* *Symplocos tinctoria* *Lindera benzoin* **herbs:** N/A **vines:** *Smilax rotundifolia* *Toxicodendron radicans* *Vitis rotundifolia*
Tributary Floodplain	**trees:** N/A **shrubs:** *Fraxnius pennsylvanica* **herbs:** *Carex spp.* **vines:** N/A	**trees:** *Quercus michauxii* *Acer rubrum* *Fraxinus pennsylvanica* *Betula nigra* *Nyssa biflora* *Quercus lyrata* *Quercus laurifolia* *Quercus phellos* *Liquidambar styraciflua* **shrubs:** *Ilex opaca* *Ilex verticillata* **herbs:** *Woodwardia areolata* *Saururus cernuus* *Viola spp.* **vines:** N/A
Low Terrace	**trees:** *Nyssa biflora* *Acer rubrum* *Fraxinus pennsylvanica* **shrubs:** N/A **herbs:** *Carex spp.* *Murdania keisak* *Hydrocotyle umbellata* *Polygonum spp.* **vines:** N/A	N/A (Low Terrace not observed at reference wetland site)

Landform/ Community Assemblage:	Little Buffalo Creek	Buffalo Creek
Little River Floodplain/ Tribuary Terrace	**trees:** *Acer rubrum* *Quercus phellos* *Betula nigra* **shrubs:** *Cyrilla racemiflora* *Nyssa biflora* *Arundinaria gigantea* **herbs:** N/A **vines:** N/A	**trees:** *Acer rubrum* *Carpinus caroliniana* *Quercus laurifolia* *Quercus nigra* *Quercus michauxii* *Crataegus spp.* *Liquidambar styraciflua* *Quercus rubra* *Pinus taeda* *Quercus phellos* *Ilex opaca* *Ulmus alata* **shrubs:** *Arundinaria gigantea* *Vaccinium corymbosum* *Symplocos tinctoria* *Lindera benzoin* **herbs:** N/A **vines:** *Smilax rotundifolia* *Toxicodendron radicans* *Vitis rotundifolia*
Tributary Floodplain	**trees:** N/A **shrubs:** *Fraxnius pennsylvanica* **herbs:** *Carex spp.* **vines:** N/A	**trees:** *Quercus michauxii* *Acer rubrum* *Fraxinus pennsylvanica* *Betula nigra* *Nyssa biflora* *Quercus lyrata* *Quercus laurifolia* *Quercus phellos* *Liquidambar styraciflua* **shrubs:** *Ilex opaca* *Ilex verticillata* **herbs:** *Woodwardia areolata* *Saururus cernuus* *Viola spp.* **vines:** N/A
Low Terrace	**trees:** *Nyssa biflora* *Acer rubrum* *Fraxinus pennsylvanica* **shrubs:** N/A **herbs:** *Carex spp.* *Murdania keisak* *Hydrocotyle umbellata* *Polygonum spp.* **vines:** N/A	N/A (Low Terrace not observed at reference wetland site)

APPENDIX D

PHOTOS

Streamside assemblage community along the Little River banks in the Buffalo Creek reference wetland. The mouth of Buffalo Creek is visible just to the left of the vine-covered debris pile.

Backwater slough area at the Buffalo Creek reference wetland

Little River floodplain/Buffalo Creek terrace at the Buffalo Creek reference wetland

Buffalo Creek floodplain off the left bank of Buffalo Creek (channel is out of view in this frame)

APPENDIX F

WATER RESOURCES DATA

Section B - Chapter 6
Neuse River Subbasin 03-04-06
Little River and Buffalo Creek

6.1 Subbasin Overview

Subbasin 03-04-06 at a Glance

Land and Water Area

Total area:	317 mi^2
Land area:	317 mi^2
Water area:	0 mi^2

Population Statistics

2000 Est. Pop.:	54,160 people
Pop. Density:	172 persons/mi^2

Land Cover (percent)

Forest/Wetland:	59.4
Surface Water:	0.8
Urban:	3.2
Cultivated Crop:	33.0
Pasture/ Managed Herbaceous:	3.7

Municipalities
Rolesville, Zebulon, Wendell and Goldsboro

Counties
Franklin, Johnston, Wake, Wayne and Wilson

Population growth in the subbasin is increasing near Wendell and Zebulon in eastern Wake County and near Goldsboro in Wayne County. Population density is highest (320-1,600 persons/mi^2) in the lower portion of the subbasin, near Goldsboro.

There are 2,047 acres of managed public lands in this subbasin including land around the Little River Reservoir in the upper portion of the subbasin and the Claridge Forest Center near Goldsboro.

There are six NPDES wastewater discharge permits in this subbasin with a total permitted flow of 0.9 MGD (Figure B-6). There is also one individual NPDES stormwater permit in the subbasin. Wayne and Wake counties will be required to develop a stormwater program under Phase II (page 76). Johnston County and the above counties have submitted model stormwater ordinances as required by the Neuse NSW strategy stormwater rules (page 64). There are also 11 registered animal operations in this subbasin.

There were four benthic macroinvertebrate community samples and two fish community samples (Figure B-6 and Table B-16) collected in 2000 as part of basinwide monitoring. Two sites remained the same; two sites increased in bioclassification, and two sites had a lower bioclassification. Lower bioclassifications at the fish community sites may have been related to recent hurricanes. Refer to *2001 Neuse River Basinwide Assessment Report* at http://www.esb.enr.state.nc.us/bar.html and Section A, Chapter 3 for more information on monitoring.

Figure B-6 Neuse River Subbasin 03-04-06

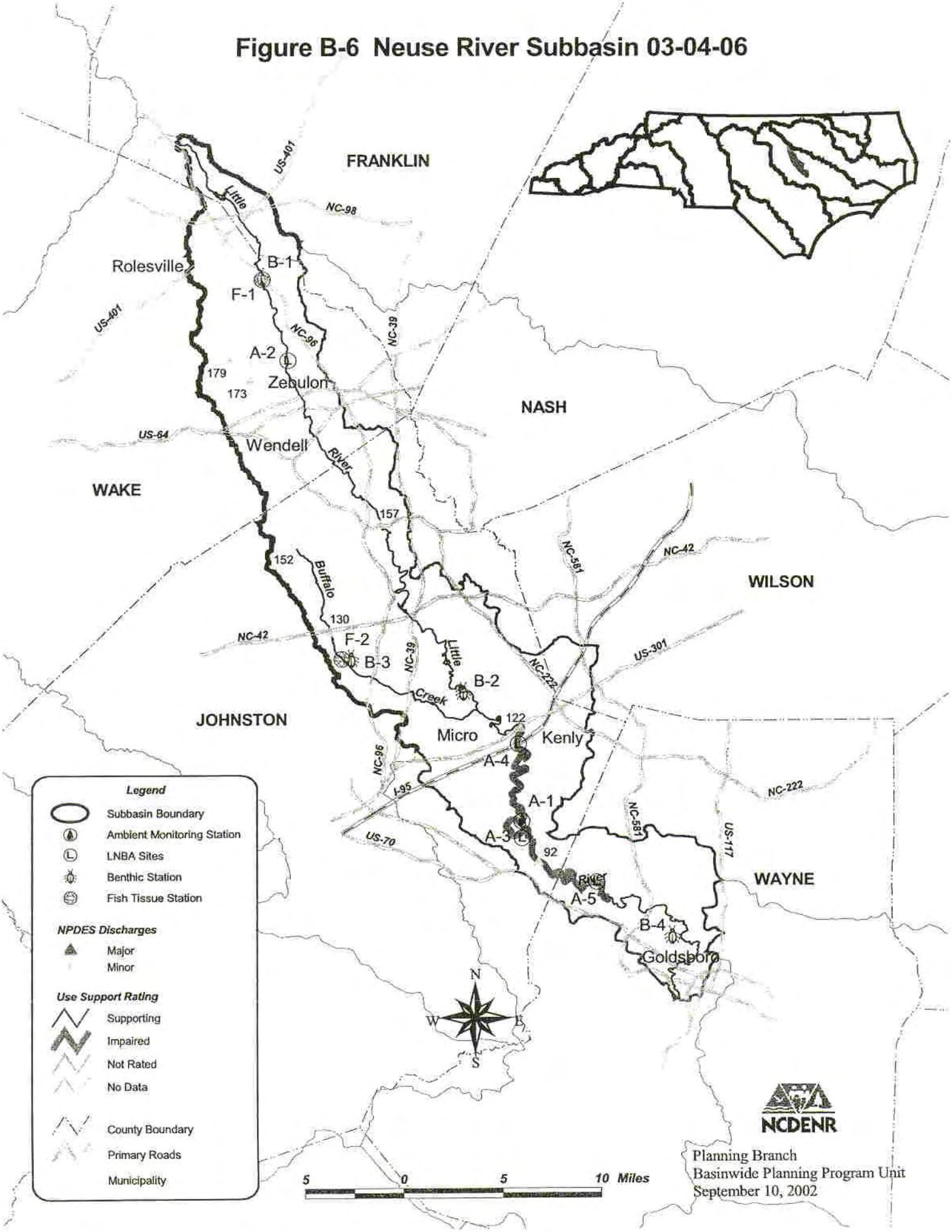


Table B-16 DWQ Monitoring Locations in Subbasin 03-04-06

Benthic Macroinvertebrate Community Monitoring Sites					
Map #[1]	**Waterbody**	**County**	**Location**	**1995**	**2000**
B-1	Little River[2]	Wake	NC 96	Good-Fair	Good-Fair
B-2	Little River[2]	Johnston	SR 2130	Good-Fair	Good
B-3	Buffalo Cr	Johnston	SR 1941	Fair (1991)	Good-Fair
B-4	Little R[2]	Wayne	NC 581	Good-Fair	Good-Fair
Fish Community Monitoring Sites					
Map #[1]	**Waterbody**	**County**	**Location**	**1995**	**2000**
F-1	Little R	Wake	NC 96	Good	Good-Fair
F-2	Buffalo Cr	Johnston	SR 1941	Excellent	Good-Fair
Ambient Monitoring Sites					
Map #[1]	**Waterbody**	**County**	**Location**	**Station #**	**Noted Parameters[3]**
A-1	Little River	Johnston	Near Princeton	J5850000	none
A-2[4]	Little River	Wake	SR 2333	J5620000	none
A-3[4]	Little River	Johnston	US 301	J5690000	DO
A-4[4]	Little River	Johnston	I 95	J5730000	DO
A-5[4]	Little River	Wayne	SR 1234	J5900000	DO
A-6[4]	Little River	Wayne	Nr Asylum	J5950000	none

[1] B = benthic macroinvertebrates; F = fish community; A = ambient monitoring station; SB = benthic macroinvertebrates special study site; and SF = fish community special study site.

[2] Historical data available at this site. Refer to Appendix II.

[3] Parameters are noted if in excess of state standards in greater than 10 percent of all samples.

[4] LNBA Sites (page 220). Only dissolved oxygen, chlorophyll *a* and fecal coliform were analyzed.

Use support ratings are summarized in Part 6.2 below. Recommendations, current status and future recommendations for waters that were impaired in 1998 are discussed in Part 6.3 below. Current status and future recommendations for newly impaired waters are discussed in Part 6.4 below. Water quality issues related to the entire subbasin are discussed in Part 6.5. Unless otherwise noted, all discussions are for the aquatic life and secondary recreation use support category. Refer to Appendix III for a complete list of monitored waters by use support category and more information on supporting monitored waters.

6.2 Use Support Summary

Use support ratings (page 54) in subbasin 03-04-06 were assigned for aquatic life and secondary recreation, fish consumption and water supply. All waters in the subbasin are considered impaired on an evaluated basis because of fish consumption advisories (page 93). All water

supply waters are supporting on an evaluated basis based on reports from DEH regional water treatment consultants.

There were 103 stream miles (47 percent) monitored during this assessment period. Approximately 20 (19 percent) of the monitored stream miles are impaired. Refer to Table B-17 for a summary of use support ratings by use support category for waters in the subbasin. Use support ratings for waters that were monitored and impaired in at least one use support category or were impaired in 1998 are presented in Table B-18.

Table B-17 Summary of Use Support Ratings by Use Support Category in Subbasin 03-04-06

Use Support Rating	Basis	Aquatic Life and Secondary Recreation	Fish Consumption	Primary Recreation	Water Supply
Supporting	Monitored	82.9 mi	0	0	0
	All Waters	82.9 mi	0	0	120.4 mi
Impaired	Monitored	**20.0**	0	0	0
	All Waters	20.0	217.4 mi	0	0
Not Rated	Monitored	0	0	0	0
No Data	N/A	114.5 mi	0	7.4 mi	0
Total	Monitored	102.9 mi	0	0	0
	All Waters	217.4 mi	217.4 mi	7.4 mi	120.4 mi
	Percent Monitored	47% mi	0%	0%	0%

Note: All waters include monitored, evaluated and waters that were not assessed.

Table B-18 Previously or Currently Impaired Waters in Subbasin 03-04-06

Name	1998 Status	2002 Status	Use Support Category	Miles
Little River	Supporting	Impaired	Aquatic Life/Secondary Recreation	20.0
Buffalo Creek	Impaired	Supporting/Not Rated	Aquatic Life/Secondary Recreation	N/A
			Total 2002 Impaired Miles	**20.0**

6.3 Status and Recommendations of Previously Impaired Waters

6.3.1 Buffalo Creek

1998 Recommendations
Buffalo Creek was partially supporting from the source to the Little River. It was recommended that a more detailed study of the watershed be undertaken to determine possible causes of impairment and that the creek be resampled.

Current Status
Buffalo Creek (15 miles) from the Wendell Lake to the Little River is currently supporting with Good-Fair bioclassifications at sites B-3 and F-2. There was a drop in bioclassification for the fish community because of a decrease in diversity. Good instream habitat was noted although some hurricane impacts were also noted. The upper watershed is in the rapidly developing area of eastern Wake County.

2002 Recommendations
DWQ will continue to monitor Buffalo Creek to assess future impacts related to development in the upper watershed. Communities in eastern Wake County should consider water quality impacts to Buffalo Creek during development and utilize BMPs to minimize these impacts during and after development activities. Refer to (page 81) for a description of urban stream problems and recommendations for reducing impacts and restoring water quality. Because of the water quality impacts noted above and the rapid development, Buffalo Creek is a NCWRP targeted local watershed (page 203).

6.4 Status and Recommendations of Waters Newly Impaired Waters

6.4.1 Little River

Current Status 2002 Recommendations
The Little River (20 miles from Buffalo Creek to NC581) is currently impaired because dissolved oxygen was below 4 mg/l in 16.3 percent (site A-3), 17.5 percent (site A-4) and 10.0 percent (site A-5) of samples at these sites.

The Little River is currently supporting based on Good-Fair bioclassifications in the upper and lower watershed and a Good bioclassification in the middle segment. Several rare invertebrate species were collected at the upper site with good instream habitat noted. The fish community here may have been impacted by recent hurricanes. The middle site had infrequent pools and riffles. This segment also contains large numbers of rare mussels and aquatic insects. There is noted long-term decline in water quality at the lower site. No mussels were collected although dead shells were observed. Rare aquatic insects were not collected at this site. Recent silt deposition was noted at this site as well.

The upper watershed drains the rapidly developing area of eastern Wake County. The lower watershed is near Goldsboro.

2002 Recommendations

DWQ and LNBA (page 220) will continue to monitor the Little River to assess impacts related to land use changes and to determine the source of the low dissolved oxygen. Because of the rare species in the Little River, this watershed should be targeted for land acquisition to protect the riparian area beyond the 50-foot required buffer (page 64). Refer to page 81 for a description of urban stream problems and recommendations for reducing impacts and restoring water quality. Wake County Parks and Recreation has received a CWMTF grant to establish greenways on portions of the Little River. Because of the water quality impacts noted above and the increasing development pressure, parts of the Little River are NCWRP targeted local watersheds (page 203).

6.5 Additional Water Quality Issues Within Subbasin 03-04-06

This section discusses issues that may threaten water quality in the subbasin that are not specific to particular streams, lakes or reservoirs. The issues discussed may be related to waters near certain land use activities or within proximity to different pollution sources.

6.5.1 Impacts of Post-Hurricane De-Snagging on Instream Habitats

Many streams in the subbasin have noted impacts from the recent hurricanes. The biological community in the streams can recover rapidly if instream habitat is maintained. De-snagging operations should carefully remove debris from stream channels to restore natural flow and leave enough instream habitats so the biological community can recover. For more information on this issue, refer to page 86.

NPDES Permit Map Labels for Subbasin Maps in Section B

Permit	Facility	Subbasin	Id number
NC0063746	IRA D. LEE-DEERCHASE	03-04-02	197
NC0073318	IRA D. LEE-WHIPPOORWILL VALLEY	03-04-02	198
NC0056278	RIVER MILL HOMEOWNER ASSN; INC	03-04-02	200
NC0007528	WAKE FOREST; TOWN - WTP	03-04-02	201
NC0083747	DUTCHMAN CREEK; INC./TWIN LAKE	03-04-03	73
NC0073679	HEATER UTIL-OAK HOLLOW WTP	03-04-03	124
NC0066516	FUQUAY-VARINA (TOWN) - WWTP	03-04-03	126
NC0035181	N.C. CENTER FOR MATURE ADULTS	03-04-03	127
NC0066150	BROOKFIELD PROP-BRIGHTON FOR	03-04-03	128
NC0062715	HEATER UTIL/CROOKED CREEK	03-04-03	131
NC0061638	NERO UTILITY - AMHERST WWTP	03-04-03	132
NC0065102	CARY (TOWN) - SOUTH WWTP	03-04-03	133
NC0082996	HEATER UTIL-HOLLYBROOK	03-04-03	144
NC0062740	HEATER UTIL/BRIARWOOD FARMS	03-04-03	145
NC0022217	STAR ENTERPRISE SALES TERMINAL	03-04-03	150
NC0064050	APEX (TOWN)-MIDDLE CREEK WWTP	03-04-03	151
NC0084654	MOTIVA ENTERPRISES-APEX TERM.	03-04-03	153
NC0020389	BENSON (TOWN) - WWTP	03-04-04	87
NC0065196	DUPREE'S MOBILE HOME COURT	03-04-04	104
NC0078255	JAG INC.-W. JOHNSON MOBILE ***	03-04-04	115
NC0032573	LENOIR CO SCH-MOSS HILL ELEM.	03-04-05	61
NC0020541	KINSTON (CITY)-PEACHTREE WWTP	03-04-05	64
NC0084999	KENNEDY BAPTIST HOME ***	03-04-05	65
NC0076724	COASTAL LUMBER CO./KINSTON	03-04-05	66
NC0024236	KINSTON (CITY)-NORTHSIDE WWTP	03-04-05	67
NC0039233	WALNUT CREEK (VILLAGE)-WWTP	03-04-05	69
NC0021644	LA GRANGE (TOWN) - WWTP	03-04-05	71
NC0003760	DUPONT FIBERS - KINSTON PLANT	03-04-05	74
NC0003760	DUPONT FIBERS - KINSTON PLANT	03-04-05	75
NC0003760	DUPONT FIBERS - KINSTON PLANT	03-04-05	76
NC0063177	SEYMOUR JOHNSON AIR FORCE B***	03-04-05	79
NC0063177	SEYMOUR JOHNSON AIR FORCE B***	03-04-05	80
NC0064891	KENLY; TOWN - REGIONAL WWTP	03-04-06	122
NC0064556	RIVER DELL UTIL-BUFFALO CREEK	03-04-06	130
NC0064246	PACE MOBILE HOME PARK	03-04-06	152
NC0038938	JOHNSTON CO BOE-CORINTH HOLDER	03-04-06	157
NC0086266	CWS - WOODTRACE WELL #1 WTP	03-04-06	173
NC0049042	RILEY HILL BAPTIST CHURCH INC.	03-04-06	179
NC0032557	LENOIR CO SCH-S. LENOIR HIGH	03-04-07	56

Neuse River Basin

Subbasin: 30405

Waters for which TMDLs are required.

Waterbody and Description	Assessment Unit (AU)	Class	Subbasin	ImpairedUse	Year Listed	Category and Reason for Listing	Potential Source(s)	Miles	Acres
Walnut Creek (Lake Wackena, Spring Lake)	27-68	C NSW	30405		**1998**	**5**		6.9	
From source to Neuse River				**Aquatic Life**	1. 2004	5 Standard violation: Low Dissolved Oxygen	1 Minor Municipal Point Source		
				Overall	1. 1998	5 Aquatic Weeds			

Neuse River Basin

Subbasin: 30406

Waters for which TMDLs are required.

Waterbody and Description	Assessment Unit (AU)	Class	Subbasin	ImpairedUse	Year Listed	Category and Reason for Listing	Potential Source(s)	Miles	Acres
Little River	27-57-(20.2)a	WS-IV NSW	30406		**2004**	**5**		8.5	
From Spring Branch to 4.2 miles upstream of NC 581				**Aquatic Life**	1. 2004	5 Standard violation: Low Dissolved Oxygen	1 Minor Municipal Point Source		
Little River (Tarpleys Pond)	27-57-(8.5)b	WS-V NSW	30406		**2004**	**5**		11.5	
From Little Buffalo Creek to Spring Branch				**Aquatic Life**	1 2004	5 Standard violation: Low Dissolved Oxygen	1. Minor Municipal Point Source		
Buffalo Creek	27-57-16-(2)	B NSW	30406		**1998**	**6**		5.8	
From dam at Robertsons Pond to a point 200 feet upstream from West Haywood Street near Wendell				**Overall**	1. 1998	6 Impaired biological integrity: stressors not identified	1. Agriculture		
Buffalo Creek (Wendell Lake)	27-57-16-(3)a	C NSW	30406		**1998**	**6**		5.0	
From a point 200 feet upstream from West Haywood Street near Wendell to Little River				**Overall**	1. 1998	6 Impaired biological integrity: stressors not identified	1. Agriculture 2 Construction		

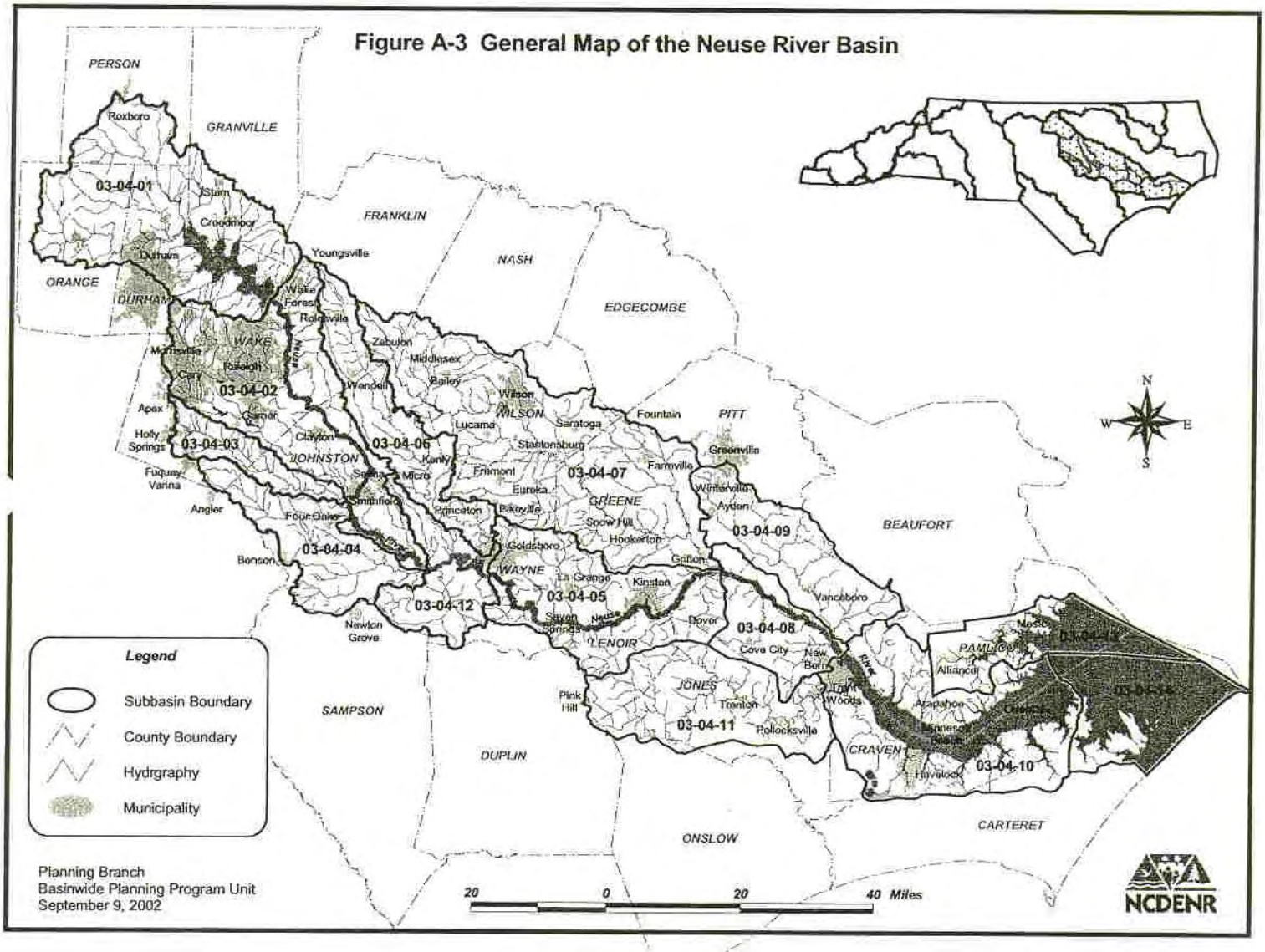


Figure A-3 General Map of the Neuse River Basin
PERSON
GRANVILLE
FRANKLIN
NASH
EDGECOMBE
ORANGE
DURHAM
WAKE
JOHNSTON
WILSON
PITT
GREENE
WAYNE
LENOIR
JONES
CRAVEN
PAMLICO
BEAUFORT
SAMPSON
DUPLIN
ONSLOW
CARTERET
03-04-01
03-04-02
03-04-03
03-04-04
03-04-05
03-04-06
03-04-07
03-04-08
03-04-09
03-04-10
03-04-11
03-04-12
Roxboro
Stem
Creedmoor
Durham
Youngsville
Wake Forest
Rolesville
Zebulon
Middlesex
Morrisville
Cary
Raleigh
Wendell
Bailey
Wilson
Apex
Garner
Lucama
Saratoga
Fountain
Holly Springs
Clayton
Stantonsburg
Greenville
Kenly
Fremont
Farmville
Fuquay-Varina
Selma
Micro
Eureka
Wintervile
Smithfield
Princeton
Pikeville
Ayden
Angier
Four Oaks
Snow Hill
Hookerton
Benson
Goldsboro
Grifton
La Grange
Kinston
Vanceboro
Newton Grove
Dover
Neuse
Cove City
New Bern
Trent Woods
Pink Hill
Trenton
Pollocksville
Alliance
Aurora
Atlantic
Havelock
Legend
Subbasin Boundary
County Boundary
Hydrgraphy
Municipality
Planning Branch
Basinwide Planning Program Unit
September 9, 2002
20
0
20
40 Miles
N
W
E
S
NCDENR

Table A-3 Hydrologic Subdivisions in the Neuse River Basin

Watershed Name and Major Tributaries	DWQ Subbasin 6-digit Codes	USGS 8-digit Hydrologic Units	USGS 14-digit Hydrologic Units Local Watersheds*
Upper Neuse		03020201	
Falls Lake and Little, Eno and Flat Rivers	03-04-01		010010, 060010, 020020, 050040, 010030, 030030, 065030, 010040, 040020, 020040, 065010, 020010, 030020, 0650040, 010020, 060020, 065050, 010050, 030040, 050010, 010010, 020030, 050030, 050020, 030010, 030050, 060030
Crabtree Creek and Swift Creek	03-04-02		070060, 070110, 0110040, 080020, 0110010, 0100040, 070070, 100020, 100050, 070090, 100030, 110070, 080010, 090010, 110050, 070100, 110020, 140020, 070080, 100010, 110060, 070120, 110030, 140010
Middle Creek and Bass Lake	03-04-03		100010, 120020, 120030
Black Creek and Hannah Creek	03-04-04		130010, 130020, 130030, 150010, 150020, 150050, 150030, 150040
Little River and Buffalo Creek	03-04-06		180010, 180070, 180040, 180050, 180060, 200010, 180020, 190010, 200020, 180030, 180080
Neuse River	03-04-12		160010, 170020, 170030, 200030, 170040, 200040, 170010, 170060, 170050
Middle Neuse		03020202	
Bear Creek and Stone Creek	03-04-05		010010, 030030, 020030, 040010, 040020, 020030, 060040, 030020, 070010, 020020, 010021, 060030, 050020, 060020, 030010, 020010, 050030, 010040, 040030, 060010, 030040, 010020, 010030, 050040, 010022, 050010, 070020, 010050
Core Creek	03-04-08		090020, 080020, 080010, 100020, 090080, 100010
Swift Creek and Clayroot Swamp	03-04-09		090010, 090030, 090040, 090050, 090055, 090060, 090070
Contentnea		03020203	
Contentnea Creek and Little Contentnea Creek	03-04-07		010010, 010020, 020010, 020020, 020030, 020040, 020050,030010, 030020, 030030, 030040, 040010, 040020, 040030, 040040, 050010, 050020, 050030, 050040, 050050, 050060, 060010, 060020, 060030, 060040, 060040, 060050, 070010, 070020, 070030, 070040, 070050
Lower Neuse		03020204	
Slocum Creek	03-04-10		020010, 020020, 020030, 020040, 020050, 020060, 030010, 030020, 030030, 030040, 030050, 040010, 050010, 050020, 050030, 050040, 050050, 060010, 060020, 070010
Trent River	03-04-11		010010, 010020, 010021, 010030, 010031, 010040, 010050, 01051, 010060, 010070, 010071, 010080, 010100
Pamlico Sound		03020105	
Pamlico Sound Bay River	03-04-13		010010, 010020, 010030, 010040, 020010, 020020, 020030, 090012
Bogue-Core Sounds		03020106	
Core Sound West Bay	03-04-14		050010, 050050, 050060, 050070

* Numbers from the 8-digit and 14-digit column make the full 14-digit HU.

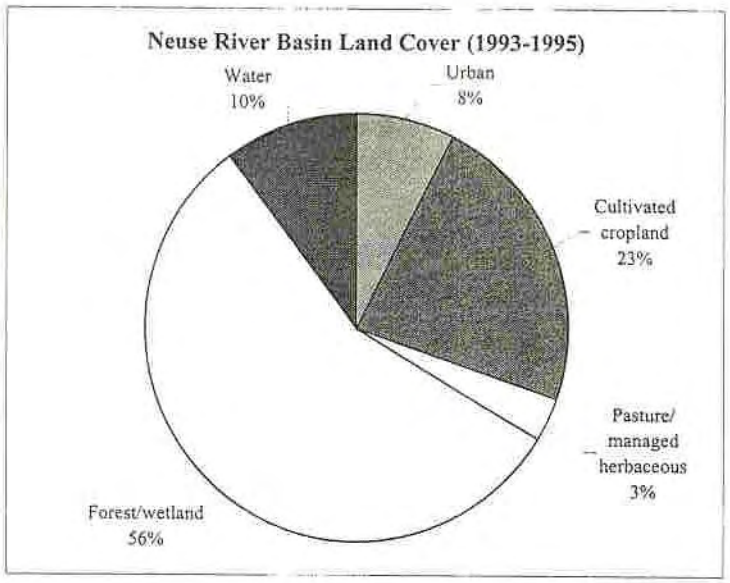


Figure A-6 Percentages within Major CGIA Land Cover Categories in the Neuse River Basin

2.5.2 NRI Land Cover Trends

Land cover information in this section is from the most current National Resources Inventory (NRI), as developed by the Natural Resources Conservation Service (USDA, updated June 2001). The National Resources Inventory (NRI) is a statistically based longitudinal survey that has been designed and implemented to assess conditions and trends of soil, water and related resources on the Nation's nonfederal rural lands. The NRI provides results that are nationally and temporally consistent for four points in time -- 1982, 1987, 1992 and 1997.

In general, NRI protocols and definitions remain fixed for each inventory year. However, part of the inventory process is that the previously recorded data are carefully reviewed as determinations are made for the new inventory year. For those cases where a protocol or definition needs to be modified, all historical data must be edited and reviewed on a point-by-point basis to make sure that data for all years are consistent and properly calibrated. The following excerpt from the *Summary Report: 1997 National Resources Inventory* provides guidance for use and interpretation of current NRI data:

> *"The 1997 NRI database has been designed for use in detecting significant changes in resource conditions relative to the years 1982, 1987, 1992 and 1997. All comparisons for two points in time should be made using the new 1997 NRI database. Comparisons made using data previously published for the 1982, 1987 or 1992 NRI may provide erroneous results because of changes in statistical estimation protocols, and because all data collected prior to 1997 were simultaneously reviewed (edited) as 1997 NRI data were collected."*

Flat River

Ten rare animal species - one fish, one amphibian and eight mussels - make their home in this river in Person and Durham counties. While the lower portions of the river are protected by NC State University's Hill Forest, protection is lacking for the lands along the upper portions of the river.

Swift Creek

This stream in southern Wake and Johnston counties contains 11 rare animals: one fish and ten mussels, including the federally endangered dwarf wedgemussel. Although there are several protected areas along the stream above Lake Wheeler, all of the rare animals live in the creek below Lake Benson, where there are no lands protected along the banks of the stream. Thus, protection efforts are greatly needed downstream of Lake Benson.

Turkey Creek

This stream in Nash and northwestern Wilson counties contains one rare amphibian and six rare mussel species, including the federally endangered dwarf wedgemussel. Though there is a protected site in its floodplain, there are no protected areas along the banks of the creek; thus, protection efforts are greatly needed.

Little River

The Neuse River basin contains two Little Rivers that contain rare species or communities. Beginning in Franklin County, the Little River that flows through Wake, Johnston and Wayne counties contains 12 rare animals: three fishes, one amphibian and eight mussels, including several populations of the federally endangered dwarf wedgemussel. The only protected site along the river is Mitchells Mill State Natural Area in Wake County. A reservoir, which will impact some of these rare species, will be constructed on the river downstream from Mitchells Mill State Natural Area. Aquatic species would benefit from protection efforts along the Little River.

Middle Creek

This tributary in southern Wake and Johnston counties contains 11 rare animals: two fishes, one amphibian and eight mussels, including the federally endangered dwarf wedgemussel. Most of the creek flows through private, unprotected lands.

Moccasin Creek

This stream runs along the boundaries of Wake, Franklin, Nash and Johnston counties and contains one rare amphibian and four rare mussel species, one of which is the federally endangered dwarf wedgemussel. Except for a very small nature preserve in Johnston County, there are no protected lands along this creek; thus, protection efforts are greatly needed.

fall and early spring generally in the lower river and its tributaries. Yellow and white perch provide good fishing from late winter through the spring in the lower Neuse, in particular the Trent River. Channel, blue and flathead catfish provide additional angling opportunities throughout the year. Although large catfish (>20 lbs.) are common throughout the river and its major tributaries, much of the effort is concentrated from Goldsboro downstream to New Bern.

Anadromous species found within the Neuse River basin include striped bass, American shad, hickory shad, blueback herring and alewife. Although striped bass are caught year-round in the Neuse and Trent rivers near New Bern, these species mainly support seasonal fisheries as they migrate into freshwater reaches of the Neuse River to spawn each spring. From 1952 to 1998, spawning migrations of anadromous fish were impeded by Quaker Neck Dam, a low-head dam located near Goldsboro, and in most years spawning areas were limited to areas downstream of the dam. However, with the removal of Quaker Neck Dam in 1998, 74 miles of historical spawning habitat were restored. Anadromous species, in particular striped bass and American shad, now migrate upstream as far as Milburnie Dam near Raleigh, but the extent of upstream migration in a given year is highly dependent on river flows. Hickory shad, blueback herring and alewife are generally found from Goldsboro downstream to New Bern. In 2000, the Neuse River from Pitchkettle Creek upstream to Milburnie Dam in Craven, Pitt, Lenoir, Wayne, Johnston and Wake counties was designated by the NCWRC as Inland Primary Nursery Areas (15A NCAC 10C .0503).

Falls of the Neuse Reservoir is a 20,000-acre impoundment of the Neuse River located just north of Raleigh. This reservoir supports a highly valued largemouth bass fishery. During 2001, there were over 250 tournaments held for largemouth bass on this reservoir. Crappies are also a highly prized species for anglers on Falls of the Neuse Reservoir, along with channel catfish. Other species of interest include white bass, white perch and a variety of sunfish species.

2.9.6 Public Lands

As has been noted above, the Neuse River basin contains ecologically significant public lands in Eno River State Park, Cedar Island and other areas. In addition to Eno River State Park, Division of Parks and Recreation managed areas in the Neuse River basin include: William B. Umstead State Park, Waynesborough State Park, Cliffs of the Neuse State Park, Mitchell Mill State Natural Area and Occoneechee Mountain State Natural Area. The Wildlife Resources Commission manages Butner-Falls of Neuse Game Land, Caswell Farm Game Land, Cherry Farm Game Land, Goose Creek Game Land and Neuse River Game Land. State educational institution-owned land includes North Carolina State University's 1,700-acre Hill Demonstration Forest and Johnston Community College's 2,900-acre Howell Woods Environmental Learning Center. Camp Butner Training Site, owned by North Carolina National Guard, is a 4,000-acre training facility composed primarily of pine plantations and some quality natural areas, including Knap of Reeds Creek. The training facility is a large contiguous block of habitat relatively free of fragmentation – something increasingly rare in the North Carolina Piedmont; therefore, the Camp Butner (CBTS) is considered a significant natural resource.

Federally-owned land in the Neuse River basin includes both military and natural resource reservations. National Park Service owns Cape Lookout National Seashore, which includes Core Banks and Portsmouth Island. The US Fish and Wildlife Service manages Cedar Island National

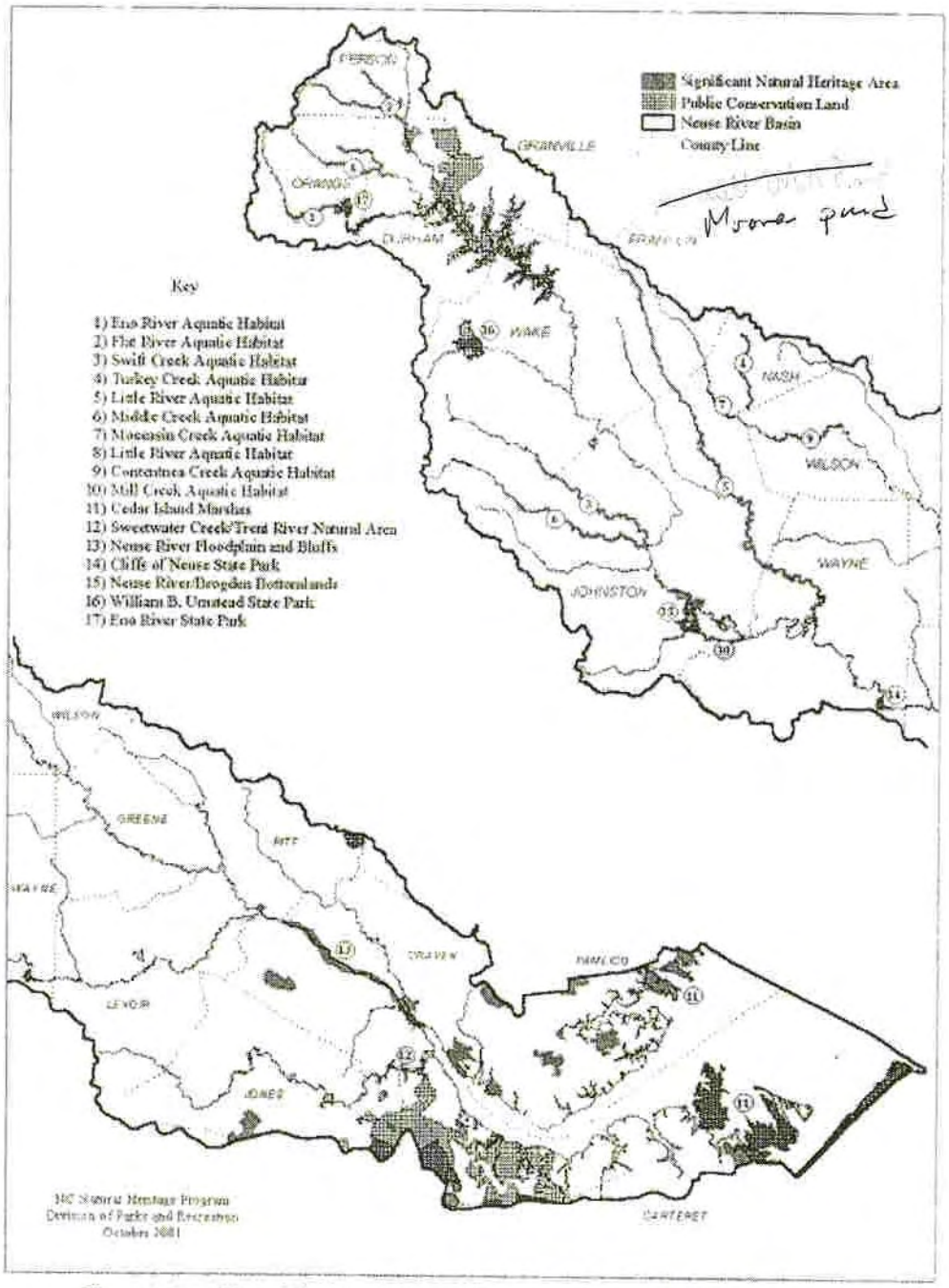


Figure A-9 Neuse River Basin Managed Lands and Significant Heritage Areas

Subbasin/ Waterbody	Location	County	Index No.	Date	ST	EPT	NCBI	EPT NCBI	BioClass
Terrible Cr	SR 1507	Johnston	27-43-15-8-(2)	6/3/86	73	13	6.58	5.26	Fair
03-04-04									
Black Cr	SR 1330	Johnston	27-45-(2)	8/9/95	47	7	6.56	5.47	Fair
				7/24/91	62	10	7.11	5.86	Fair
Mill Cr	SR 1662	Johnston	27-52	7/11/83	50	19	6.30	4.93	Good-Fair
Mill Cr	SR 1009	Johnston	27-52	8/24/00	---	12	---	5.29	Good-Fair
				8/8/95	---	12	---	4.82	Good-Fair
				8/19/91	---	13	---	5.07	Good-Fair
Hannah Cr	SR 1200	Johnston	27-52-6	7/11/83	58	11	7.55	5.72	Fair
Hannah Cr	SR 1009	Johnston	27-52-6	8/15/00	---	11	---	5.68	Fair
				8/8/95	---	13	---	5.33	Good-Fair
				8/19/91	---	8	---	5.27	Fair
Stone Cr	SR 1138	Johnston	27-52-5	8/9/95	---	8	---	5.46	Good-Fair
03-04-05									
Neuse R	NC 58	Lenoir	27-(56)	10/17/00	62	22	5.42	4.17	Good
				8/7/95	58	20	5.08	4.18	Good
				7/19/91	60	21	5.21	4.75	Good
				7/10/90	70	24	5.38	4.51	Good
				7/11/88	71	24	5.66	4.97	Good
				7/7/87	76	23	5.85	4.84	Good-Fair
				6/26/86	74	23	6.28	5.17	Good-Fair
				9/3/85	74	22	5.83	4.73	Good-Fair
				9/4/84	63	20	5.57	4.46	Good
				7/25/83	60	18	5.65	4.90	Good
Stoney Cr	Ashe St park	Wayne	27-62	6/15/00	52	5	7.19	6	Fair
Stoney Cr	SR 1920	Wayne	27-62	8/22/00	---	8	---	5.60	Fair
				6/15/00	50	5	6.98	5.73	Fair
				8/8/95	---	4	---	5.96	Poor
Bear Cr	SR 1731	Wayne	27-572	10/13/00	63	21	5.25	4.24	Good
Bear Cr	SR 1311	Lenoir	27-72	8/22/00	---	13	---	5.24	Good-Fair
				8/7/95	---	7	---	5.40	Fair
				7/10/91	---	14	---	4.92	Good-Fair
Falling Cr	SR 1546	Lenoir	27-77	1/7/97	---	8	---	5.31	Poor
Falling Cr	SR 1519	Lenoir	27-77	10/5/00	---	11	---	5.44	Fair
Falling Cr	SR 1001	Lenoir	27-77	11/18/99	---	13	---	5.61	Good-Fair
Falling Cr	SR 1340	Lenoir	27-77	7/10/91	---	14	---	4.55	Good-Fair
				8/7/95	---	12	---	5.45	Good-Fair
Southwest Cr	SR 1804	Lenoir	27-80	8/7/95	---	6	---	6.03	Not Rated
Briery Run	SR 1732	Lenoir	27-81-8	7/10/91	---	6	---	6.03	Not Rated
				11/2/93	23	1	8.82	6.37	Not Rated
Stonyton Cr	SR 1742	Lenoir	27-81-8	11/2/93	25	1	7.52	5.50	Not Rated
03-04-06									
Little R	NC 96	Wake	27-57-(1)	08/15/00	---	20	---	5.09	Good-Fair
				08/24/95	94	21	6.48	4.94	Good-Fair
				01/27/95	70	20	6.45	4.84	Good-Fair
				08/14/91	81	21	6.35	5.13	Good-Fair
				11/06/84	98	25	6.12	4.64	Good-Fair
				09/21/84	92	21	5.98	4.94	Good-Fair
				08/02/84	96	18	5.87	4.62	Good-Fair
				06/22/84	101	23	6.00	4.77	Good-Fair
				05/15/84	107	26	5.91	4.49	Good
				04/13/84	104	32	5.62	4.31	Good
				03/14/84	102	30	5.74	4.42	Good
				02/10/84	89	24	5.65	4.67	Good
				01/23/84	80	28	5.74	5.03	Good

Subbasin/ Waterbody	Location	County	Index No.	Date	ST	EPT	NCBI	EPT NCBI	BioClass
				12/16/83	107	28	6.19	5.40	Good-Fair
				11/22/83	100	25	6.33	5.15	Good-Fair
				10/14/83	96	21	6.10	4.89	Good-Fair
				09/07/83	89	19	6.43	4.94	Good-Fair
Little R	SR 2224	Wake	27-57-(1)	01/27/95	75	15	6.19	5.01	Good-Fair
Little R	SR 1722	Johnston	27-57-(8.5)	07/23/91	77	19	6.14	4.72	Good-Fair
Little R	SR 2130	Johnston	27-57-(8.5)	08/15/00	66	19	5.51	4.68	Good
				08/24/95	75	16	5.98	4.85	Good-Fair
				07/23/91	75	24	5.39	4.73	Good
				03/24/88	---	37	---	3.55	Excellent
Little R	SR 2335	Johnston	27-57-(8.5)	03/23/88	---	16	---	5.17	Good-Fair
Little R	SR 2320	Johnston	27-57-(8.5)	07/11/89	64	17	5.73	5.13	Good-Fair
				07/08/87	83	23	5.77	5.01	Good-Fair
				09/03/85	78	13	6.51	5.35	Fair
				07/11/83	63	22	5.31	4.09	Good
Buffalo Cr	SR 1007	Wake	27-57-16-(2)	08/06/91	---	2	---	7.63	Poor
Buffalo Cr	SR 1941	Johnston	27-57-16-(3)	08/15/00	73	15	6.27	5.47	Good-Fair
				07/25/91	---	9	---	4.62	Fair
Mill Cr	above Kenly WWTP	Johnston	27-57-18	03/23/88	41	8	6.89	4.67	Not Rated
Mill Cr	below Kenly WWTP	Johnston	27-57-18	03/23/88	23	1	8.60	5.81	Not Rated
				07/23/91	56	5	7.30	6.90	Not Rated
Little R	NC 581	Wayne	27-57-(20.2)	08/24/00	60	17	5.56	4.48	Good-Fair
				08/24/95	69	17	6.11	4.33	Good-Fair
				07/24/91	78	25	5.51	4.58	Good
Little R	off SR 1326	Wayne	27-57-(21.1)	07/06/94	84	20	6.49	4.93	Good-Fair
Little R	above US 70	Wayne	27-57-(21.2)	07/xx/94	69	21	---	---	Good
Little R	US 70	Wayne	27-57-(21.2)	07/06/94	---	14	---	4.81	Good-Fair
03-04-07									
Moccasin Cr	NC 231	Nash	27-86-2	09/22/00	---	17	---	5.37	Good-Fair
				08/15/00	---	14	---	6.04	Good-Fair
				09/20/96	---	13	---	5.21	Fair
				08/23/95	---	16	---	5.38	Good-Fair
				07/25/91	---	17	---	4.97	Good-Fair
Moccasin Cr	SR 1131	Nash	27-86-2	05/29/91	64	16	6.01	5.32	Good-Fair
				05/10/88	79	25	5.81	5.15	Good
Little Cr	NC 39	Wake	27-86-2-4	07/23/91	46	2	7.92	7.64	Poor
Bull Br	above SR 2110	Johnston	27-86-2-6.5	10/03/00	43	17	4.96	4.21	Not Rated
Turkey Cr	SR 1109	Nash	27-86-3-(1)	08/15/00	---	11	---	6.26	Fair
Turkey Cr	SR 1101	Nash	27-86-3-(1)	05/29/91	74	14	6.67	6.10	Fair
				05/10/88	81	15	6.38	5.65	Good-Fair
Turkey Cr	SR 1128	Wilson	27-86-3-(1)	08/23/95	---	18	---	4.84	Good-Fair
				07/25/91	13	13	5.13	5.13	Good-Fair
Beaverdam Cr	SR 1111	Nash	27-86-3-8	10/03/00	56	8	6.52	6.60	Fair
				07/22/91	84	18	6.00	5.00	Good-Fair
Beaverdam Cr	SR 1112	Nash	27-86-3-8	05/29/91	75	11	6.54	5.66	Fair
				05/10/88	76	17	6.27	5.14	Good-Fair
Bloomery Swp	NC 42	Wilson	27-86-6-(3)	09/20/96	---	4	---	5.95	Poor
		Wilson		08/28/96	60	8	6.40	5.87	Good-Fair
Contentnea Cr	NC 42	Wilson	27-86-(1)	08/29/96	67	15	6	5.65	Good-Fair
Contentnea Cr	SR 1606	Wilson	27-86-(7)	08/28/96	62	9	6.96	6.07	Fair
Contentnea Cr	NC 222	Wilson	27-86-(7)	08/29/00	78	20	6.39	5.65	Good-Fair
Contentnea Cr	NC 58	Wilson	27-86-(7)	08/23/95	64	11	7.07	6.36	Fair
				07/22/91	78	19	6.28	5.38	Good-Fair
				07/09/90	54	13	6.95	5.43	Fair
				07/11/88	60	7	7.09	6.14	Fair

NPDES Permit Map Labels for Subbasin Maps in Section B

Permit	Facility	Subbasin	Id number
NC0063746	IRA D. LEE-DEERCHASE	03-04-02	197
NC0073318	IRA D. LEE-WHIPPOORWILL VALLEY	03-04-02	198
NC0056278	RIVER MILL HOMEOWNER ASSN; INC	03-04-02	200
NC0007528	WAKE FOREST; TOWN - WTP	03-04-02	201
NC0083747	DUTCHMAN CREEK; INC./TWIN LAKE	03-04-03	73
NC0073679	HEATER UTIL-OAK HOLLOW WTP	03-04-03	124
NC0066516	FUQUAY-VARINA (TOWN) - WWTP	03-04-03	126
NC0035181	N.C. CENTER FOR MATURE ADULTS	03-04-03	127
NC0066150	BROOKFIELD PROP-BRIGHTON FOR	03-04-03	128
NC0062715	HEATER UTIL/CROOKED CREEK	03-04-03	131
NC0061638	NERO UTILITY - AMHERST WWTP	03-04-03	132
NC0065102	CARY (TOWN) - SOUTH WWTP	03-04-03	133
NC0082996	HEATER UTIL-HOLLYBROOK	03-04-03	144
NC0062740	HEATER UTIL/BRIARWOOD FARMS	03-04-03	145
NC0022217	STAR ENTERPRISE SALES TERMINAL	03-04-03	150
NC0064050	APEX (TOWN)-MIDDLE CREEK WWTP	03-04-03	151
NC0084654	MOTIVA ENTERPRISES-APEX TERM.	03-04-03	153
NC0020389	BENSON (TOWN) - WWTP	03-04-04	87
NC0065196	DUPREE'S MOBILE HOME COURT	03-04-04	104
NC0078255	JAG INC.-W. JOHNSON MOBILE ***	03-04-04	115
NC0032573	LENOIR CO SCH-MOSS HILL ELEM.	03-04-05	61
NC0020541	KINSTON (CITY)-PEACHTREE WWTP	03-04-05	64
NC0084999	KENNEDY BAPTIST HOME ***	03-04-05	65
NC0076724	COASTAL LUMBER CO./KINSTON	03-04-05	66
NC0024236	KINSTON (CITY)-NORTHSIDE WWTP	03-04-05	67
NC0039233	WALNUT CREEK (VILLAGE)-WWTP	03-04-05	69
NC0021644	LA GRANGE (TOWN) - WWTP	03-04-05	71
NC0003760	DUPONT FIBERS - KINSTON PLANT	03-04-05	74
NC0003760	DUPONT FIBERS - KINSTON PLANT	03-04-05	75
NC0003760	DUPONT FIBERS - KINSTON PLANT	03-04-05	76
NC0063177	SEYMOUR JOHNSON AIR FORCE B***	03-04-05	79
NC0063177	SEYMOUR JOHNSON AIR FORCE B***	03-04-05	80
NC0064891	KENLY; TOWN - REGIONAL WWTP	03-04-06	122
NC0064556	RIVER DELL UTIL-BUFFALO CREEK	03-04-06	130
NC0064246	PACE MOBILE HOME PARK	03-04-06	152
NC0038938	JOHNSTON CO BOE-CORINTH HOLDER	03-04-06	157
NC0086266	CWS - WOODTRACE WELL #1 WTP	03-04-06	173
NC0049042	RILEY HILL BAPTIST CHURCH INC.	03-04-06	179
NC0032557	LENOIR CO SCH-S. LENOIR HIGH	03-04-07	56

APPENDIX G

LETTER FROM NEUSE RIVER FOUNDATION

Neuse River Foundation, Inc.

112 South Blount Street • Raleigh, NC 27601
www.neuseriver.org

DOWNSTREAM
220 South Front Street
New Bern, NC 28560
252-637-7972
252-514-0051 Fax

UPSTREAM
112 South Blount Street
Raleigh, NC 27601
919-856-1180
919-839-0767 Fax
jackie.nrf@att.net

RIVERKEEPERS
Lower Neuse,
Larry Baldwin
252-637-1970
Riverkeeper@neuseriver.org

Upper Neuse
Dean Naujoks
919-856-1180
Dean.nrf@att.net

BOARD OF DIRECTORS
Natalie Bagget
Phil Bowie
Richard Dove
Mary Ann Harrison
Richard Goodwin
William Olah
Robert Overman
Joseph Seigler
Sandra Parker
David McCracken

Earth Share
OF NORTH CAROLINA

Johnston County Government
P.O. Box 1049
Smithfield, NC 27577

Dear Johnston County Commissioners,

The National Park Service (NPS) is considering designating Little River in Johnston and Wayne Counties a Partnership Wild and Scenic River. The 2001 National Heritage Survey in Little River revealed 15 rare and endangered species of plants and animals.

While the Interior bill is on the Senate floor, Senator Burr needs to receive endorsement of this project from stakeholders like you before introducing legislation. Please contact

Senator Richard Burr
217 Russell Senate Office Building
Washington, DC 20510
Phone: (202) 224-3154
Fax: (202) 228-2981

Then in support of this Congressman Etheridge will introduce a companion bill in the House.

Congressman Etheridge also needs to receive endorsement of this project from stakeholders like you before introducing legislation. Please contact

Congressman Bob Etheridge
1533 Longworth House Office Building
Washington, D.C. 20515
Phone: (202) 225-4531
Fax: (202) 225-5662

This project will help enhance the NC Civil War Trails Program and the Mountains-To-The-Sea Trail, in addition to protecting one of the last pristine water resources in Johnston County.

Sincerely,

Dean Naujoks

Dean Naujoks, Upper Neuse Riverkeeper
Neuse River Foundation

We Speak For The River!

APPENDIX H

SHPO CORRESPONDENCE

North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

November 17, 2004

David H. Schiller
Contracts and Regulatory Affairs
1101 Haynes Street, Suite 107
Raleigh, NC 27604

Re: Lowell Mill Dam Removal, Stream Restoration Site, Little River, Johnston County, NC, ER 00-9862

Dear Mr. Schiller:

Thank you for your letter of November 4, 2004, concerning the above project.

We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

Peter B. Sandbeck

APPENDIX I

CONSERVATION EASEMENT SURVEY PLAT

Johnston lays ground for park

County accepts offer of land

BY MARTI MAGUIRE
STAFF WRITER

SMITHFIELD – County commissioners accepted a company's proposal Monday to create Johnston's first county-owned park at the site of the Lowell Mill Dam outside Kenly.

The 17-acre park will provide public access along a stretch of the Little River near Interstate 95 for fishing and other activities.

Restoration Systems LLC has a federal permit to remove the dam, which a state task force has said will replenish populations of migratory fish, such as sturgeon and striped bass, in the river.

In November, the company offered the three-fourths of an acre of land it owns to the county for use as a park, along with an endowment of $140,000.

SEE **PARK**, PAGE 4B

PARK

CONTINUED FROM PAGE 1B

Partner and founder George Howard said the company also would throw in a parking lot, rope-and-post fencing and interpretive signs on the history of the dam and the ecology of the river.

Since then, the company has agreed to buy more land, enlarging the park offer to 17 acres.

Commissioners were skeptical of the plan, voicing concerns about the cost of upkeep and being held responsible for accidents at the park.

The dam is already a popular, if perilous, fishing spot. At least three people have drowned there, caught underneath currents created by the dam.

Under the new agreement, the county will sidestep the liability caused by the dam by taking over the park only after the dam is removed in the fall.

Interest from the endowment will be used to pay for maintenance and insurance for the park, officials said.

Chairwoman Cookie Pope said the park will provide much-needed recreation for county residents. She also acknowledged that owning the park is an oddity for a county that has shunned the idea of creating a county recreation department.

"It's one of those things that just falls in your lap," Pope said. "It was an excellent offer and one we just couldn't turn down."

Restoration Systems specializes in environmental mitigation. It buys sites and improves their environmental status, then sells what are called "mitigation credits" to companies that need them to compensate for the environmental problems that come with development.

Howard said the company has donated more than 600 acres for conservation and recreation after other projects it has completed.

"This is something we are doing for the long-term benefit of our company and to leave a good project behind," Howard said.

Staff writer Marti Maguire can be reached at 829-4841 or mmaguire@newsobserver.com.

Tuesday, January 4, 2005 Your Community. Your County. Your Connection. www.theherald-nc.com 934-2176 Single copy 50c

Arts Council names new director
INSIDE, PAGE 2A

The Coats House
Legacy behind the homestead
FEATURES, 1D

Clayton boys down South, win holiday tournament.
SPORTS, 1B

Dam project moves forward

By Suzette Rodriguez
STAFF REPORTER

JOHNSTON COUNTY — Fetch your rod and reel. Dust off the canoe.

Within the next several months, a Raleigh company will tear down the Lowell Mill dam on the Little River and turn a half-mile section of the waterway into a county park. The free flow of water will bring back migratory fish — shad, herring, sturgeon and striped bass — and open up 88 square miles of new fishing territory.

On Monday, County Commissioners accepted an offer of 17 acres of land along the river and an endowment of $140,000 to maintain the property as a park.

The park will be developed by Restoration Systems, a company that restores natural areas as mitigation credits, then sells them to agencies that disrupt wetlands, streams or forest buffers.

George Howard, a partner at Restoration Systems, said work on the land would likely start in April.

A rope-and-post fence would be erected across the length of the park to create a boundary with the adjoining private property. A gravel parking lot, interpretive signs and picnic tables would be added. The work would also include some general cleaning up.

Howard said the dam would come down in the fall when temperatures cool off. "We don't want hot, still water running down the river," he added.

Howard said that Restoration Systems has a contract to buy 17 acres from the J.F. Scott family. And he said that the land on the north side of the river, which doesn't have a road access, joins a large tract of land already under a conservation easement.

Commissioner Ray Woodall said the county needed to move forward with the deal. The company first pitched its proposal in November.

Howard said the company would transfer ownership once the park was complete. And it would also give the county the endowment in one payment, rather than in two as earlier proposed.

The dam, built in 1810 to power a gristmill, has been a popular fishing and swimming hole. But during the past 15 years, three people have drowned — one as recently as 2000.

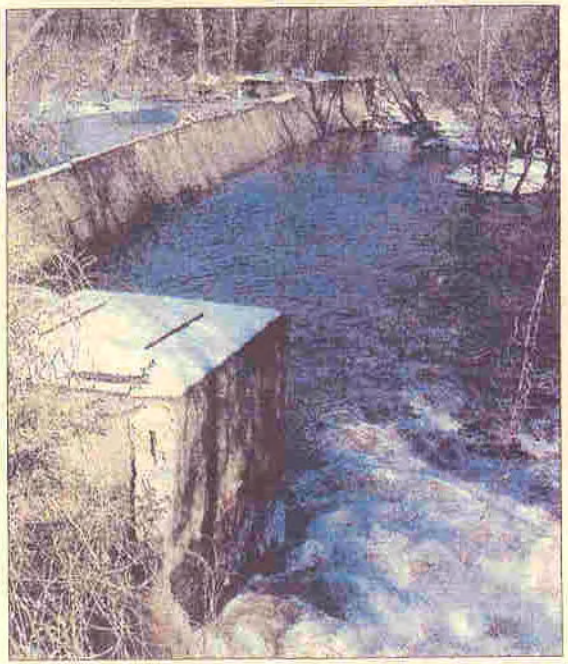
Clean opinion

If Johnston County were a corporation, one particular figure in an audit report released Monday might not sit well with stockholders: Liabilities exceeded assets by $104 million.

Alan W. Thompson, a certified public accountant, pointed out the number to County Commissioners during his report on the audit for the fiscal year ending on June 30.

There's an explanation behind the number. While the

See DAM, page 5A



The Lowell Mill Dam will come down early next fall.

HERALD PHOTO BY MICHAEL MCLOONE

DAM

CONTINUED FROM 1-A

county pays for school construction, the Board of Education holds the deeds to all the schools.

"We take all the liability; they take the assets," Commissioner Jeff Carver said. "That skews the bottom line."

Thompson said his biggest concern was the county's rising debt over the last three years as it has built schools. "I don't think there's an easy answer," he said.

In his letter to the board, Thompson pointed out that the county is borrowing significant amounts of money to meet the needs of citizens.

The borrowing for schools will have a two-prong, long-term effect, he wrote. "Obviously the debt will have to be paid back but the county's current year expenditures for operations will likely continue to increase at a rapid pace."

In his report, Thompson said the county was in good financial condition.

"Your credit rating is extremely good. I was satisfied with your records. Everybody's doing a good job," he added.

Some of the highlights from the report were as follows.

— General fund revenue exceeded expenses by $4.2 million.

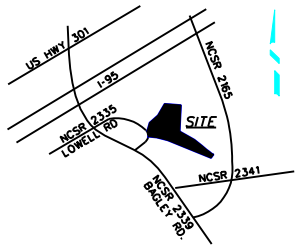
— Property tax revenue increased by $12.36 million over the previous year, while the sales tax brought in an extra $6.5 million.

— Bayer is the largest taxpayer, followed by Progress Energy, Winn-Dixie, Novo Nordisk and North Carolina Natural Gas.

— Current expense funding and capital outlay for the public schools and Johnston Community College increased $5.7 million while debt service rose $2 million.

— Undesignated reserves or the amount of funds available for spending increased slightly to $23,497,000, or 18.7 percent of the total budget ($125.68 million). Reserves made up 18.4 percent in the previous year's budget.

Herald Staff Reporter Suzette Rodriguez can be reached at 934-2176, ext. 128, or by e-mail at



VICINITY MAP (NTS)

DEED REFERENCE(S):

BEING A PORTION OF TRACT NUMBER ONE & TWO RECORDED IN D.B. 916, PG. 625 OF THE JOHNSTON COUNTY REGISTRY.

MAP REFERENCE(S):

P.B. 5, PG. 87
P.B. 59, PG. 381

CP&L REFERENCE(S):

D.B. 1182, PG. 119

STATE OF NORTH CAROLINA
COUNTY OF JOHNSTON

Filed for registration at ____ M. ___ 2005 in the Register of Deeds Office. Recorded in Book ____, Page ____

Register of Deeds By

STATE OF NORTH CAROLINA
COUNTY OF JOHNSTON

I, ____ Review Officer of Johnston County, certify that the map or plat to which this certification is affixed meets all statutory requirements for recording.

Date Review Officer

CERTIFICATE OF OWNERSHIP, DEDICATION AND MAINTENANCE

The undersigned owner hereby freely dedicates all rights-of-way, easements, streets, recreation area, open space, common area, utilities, and other improvements to public or private common use as noted on this plat, and further assumes full responsibility for maintenance and control of said improvements until they are accepted for maintenance and control by an appropriate public body or, an incorporated neighborhood or homeowners association or similar legal entity.

Date Owner

Date Owner

BUILDING CERTIFICATE

This lot has not been approved as a build-able lot by Johnston County Environmental Health Department or the Johnston Planning Department.

Date Planning Director

CERTIFICATE OF EXEMPTION

Exempt from subdivision regulation within the Johnston County Planning Jurisdiction

Date Subdivision Administrator

SURVEYORS CERTIFICATION(S)

Surveyor's disclaimer: No attempt was made to locate any cemeteries, wetlands, hazardous material sites, underground utilities or any other features above, or below ground other than those shown.

I certify that the survey is of another category (Conservation Easement), such as the recombination of existing parcels, a court-ordered survey, or other exception to the definition of a subdivision.

I JOHN A. RUBOLAN, I this plat was drawn under my supervision from (an actual survey made under my supervision) (deed description recorded in Book SEE Page REFS, etc.) (other): that the ratio of precision as calculated by latitudes and departures is 1/ 10,000 + ; that the boundaries not surveyed are shown as broken lines plotted from information found in Book ---- Page ---- ; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, registration number, and seal this 30th day of December, 2004.

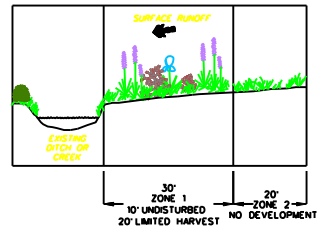
SEAL OR STAMP

Surveyor L-4194

ACREAGE DATA (BY COMPUTER):

PARCEL	DESCRIPTION	GRASSLAND	SCRUB	WOODLAND	RIVERINE AREA	TOTAL ACREAGE (16.59 ACRES ±)
TRACT 1	INCLUDING A PORTION OF THE 100' WIDE CP&L EASEMENT (D.B. 1182, PG. 119)	3.01 ACRES ±	N/A	5.65 ACRES ±	N/A	8.66 ACRES ±
TRACT 2A	EXCLUDING THE RECTANGULAR PROPERTY (P.B. 62, PG. 43), AND INCLUDING A PORTION OF 100' EASEMENT	0.23 ACRES ±	0.62 ACRES ±	5.78 ACRES ±	1.30 ACRES ±	7.93 ACRES

RIPARIAN AREA DIAGRAM:



ZONE 1

A.) CURRENTLY CONSISTS OF WOODLANDS.

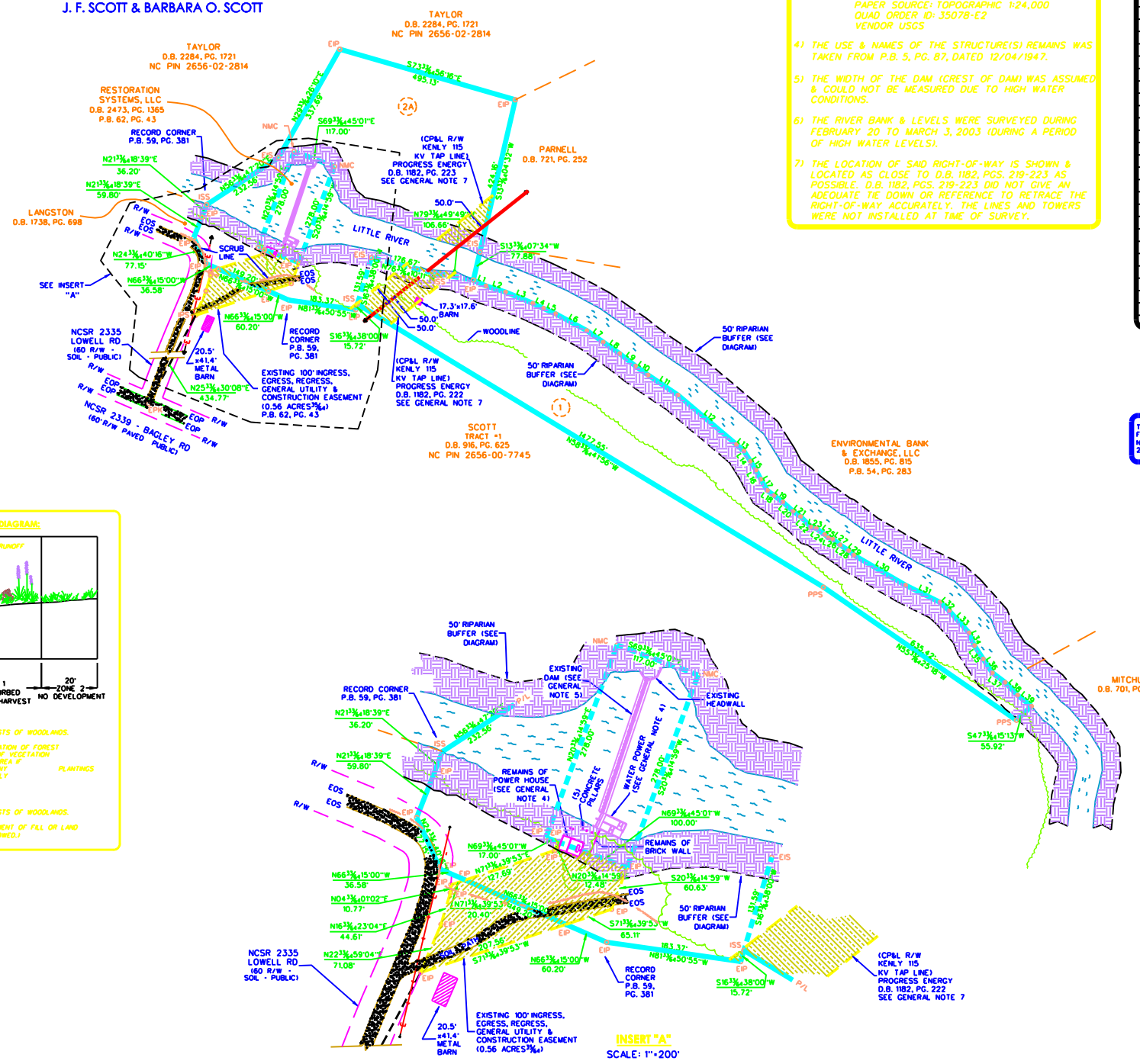
B.) NATURAL REGENERATION OF FOREST VEGETATION AND PLANTING OF VEGETATION TO ENHANCE THE RIPARIAN AREA IF DISTURBANCE IS WARRANTED, MAY SHOULD CONSIST OF LOCALLY NATIVE TREES AND SHRUBS. PLANTINGS

ZONE 2

A.) CURRENTLY CONSISTS OF WOODLANDS.

B.) (NOTE: NO PLACEMENT OF FILL OR LAND DISTURBING ACTIVITY IS ALLOWED.)

OWNER(S):
J. F. SCOTT & BARBARA O. SCOTT



GENERAL NOTES:

1) NOTE: NO ABSTRACT, TITLE, NOR TITLE COMMITMENT, NOR RESULTS OF TITLE SEARCH WERE FURNISHED TO THE SURVEYOR. ALL DOCUMENTS OF RECORD REVIEWED ARE NOTED HEREON (SEE REFERENCES). THERE MAY EXIST OTHER DOCUMENTS OF RECORD THAT MAY AFFECT THIS SURVEYED PARCEL.

2) NO HORIZONTAL CONTROL WITHIN 2000 FT.

3) RIPARIAN INFORMATION TAKEN FROM:
KENLY WEST, NC
TOPO QUAD
ORIG. DATE 1998
QUAD SERIES: 7.5'
PAPER SOURCE: TOPOGRAPHIC 1:24,000
QUAD ORDER ID: 35078-E2
VENDOR: USGS

4) THE USE & NAMES OF THE STRUCTURE(S) REMAINS WAS TAKEN FROM P.B. 5, PG. 87, DATED 12/04/1947.

5) THE WIDTH OF THE DAM (CREST OF DAM) WAS ASSUMED & COULD NOT BE MEASURED DUE TO HIGH WATER CONDITIONS.

6) THE RIVER BANK & LEVELS WERE SURVEYED DURING FEBRUARY 20 TO MARCH 3, 2003 (DURING A PERIOD OF HIGH WATER LEVELS).

7) THE LOCATION OF SAID RIGHT-OF-WAY IS SHOWN & LOCATED AS CLOSE TO D.B. 1182, PGS. 219-223 AS POSSIBLE. D.B. 1182, PGS. 219-223 DID NOT GIVE AN ADEQUATE TIE DOWN OR REFERENCE TO RETRACE THE RIGHT-OF-WAY ACCURATELY. THE LINES AND TOWERS WERE NOT INSTALLED AT TIME OF SURVEY.

LINE DATA ALONG LITTLE RIVER

LINE	LENGTH	BEARING
L1	37.42'	S65°33'22.35"E
L2	55.61'	S72°33'23.25"E
L3	79.97'	S67°33'39.10"E
L4	31.89'	S64°33'43.46"E
L5	36.10'	S65°33'30.24"E
L6	96.21'	S61°33'39.07"E
L7	54.30'	S54°33'55.22"E
L8	54.17'	S55°33'11.57"E
L9	54.47'	S51°33'45.29"E
L10	42.06'	S54°33'37.25"E
L11	97.23'	S56°33'03.14"E
L12	207.46'	S49°33'53.33"E
L13	27.19'	S48°33'50.10"E
L14	32.88'	S31°33'55.08"E
L15	28.58'	S32°33'06.07"E
L16	27.89'	S27°33'29.47"E
L17	35.29'	S30°33'18.51"E
L18	22.55'	S53°33'39.23"E
L19	29.50'	S53°33'53.13"E
L20	37.70'	S47°33'44.39"E
L21	24.94'	S53°33'46.49"E
L22	38.93'	S45°33'23.06"E
L23	15.39'	S74°33'27.03"E
L24	28.18'	S53°33'48.47"E
L25	13.22'	S48°33'54.20"E
L26	12.38'	S71°33'37.40"E
L27	25.84'	S52°33'05.00"E
L28	27.52'	S56°33'27.09"E
L29	19.34'	S50°33'09.32"E
L30	161.30'	S59°33'37.15"E
L31	104.16'	S63°33'42.22"E
L32	34.54'	S47°33'29.20"E
L33	80.37'	S41°33'48.53"E
L34	37.36'	S22°33'37.10"E
L35	43.21'	S33°33'19.50"E
L36	45.33'	S33°33'08.53"E
L37	42.92'	S53°33'51.27"E
L38	48.56'	S43°33'59.20"W
L39	48.58'	S51°33'40.02"E

LEGEND:

- EIS - Existing Iron Stake
- EIP - Existing Iron Pipe
- NMC - Non Monumented Corner
- ECM - Existing Concrete Monument
- R/W - Right-Of-Way
- B/C - Back-Of-Curb
- UP - Utility Pole
- MBL - Minimum Building Line
- EOP - Edge Of Pavement
- N/F - Now or Formerly
- ECRM - Existing Concrete R/W Monument
- CH - Chord
- EPK - Existing PK Nail
- PKS - PK Nail Set
- IPS - Iron Pipe Set (1" O.D.)
- ECM - Existing Concrete Monument
- ERRS - Existing Railroad Spike
- CC - Control Corner
- D.B. - Deed Book
- PG. - Page
- NCDOT - North Carolina Department of Transportation
- CMU - Concrete Masonry Unit
- NCSR - North Carolina Secondary Road
- HWY - Highway
- R - Radius
- BRG. - Bearing
- UP - Utility Pole
- FEMA - Federal Emergency Management Agency
- ℄ - Center Line
- ● - Non Monumented Corner
- EOS - Edge of Soil
- 50' Riparian Buffer Zone
- Easement
- P/L - Property Line
- PPS - Pump Pipe Set (3" O.D.)
- ISS - Iron Stake Set (No. 5 Rebar)

THIS AREA REPRESENTED BY THIS PLAT IS LOCATED IN A FLOOD HAZARD BOUNDARY ACCORDING TO FEMA MAP NUMBER(S) 3710IC0260 D ZONE(S): AE, DATED: OCTOBER 20, 2000.

SURVEY FOR

RESTORATION SYSTEMS, LLC

(LOWELL MILL DAM SITE)

Natural Resources Restoration & Conservation

BEULAH TOWNSHIP JOHNSTON COUNTY NORTH CAROLINA

200 100 0 200 400 600

GRAPHIC SCALE 1" = 400'

2473
8365

BOOK 2473 PAGE 365

FILED
JOHNSTON COUNTY
CRAIG OLIVE
REGISTER OF DEEDS

Johnston County, North Carolina
CRAIG OLIVE Register of Deeds
The following certificate(s) of
DICKIE G BATTEN

notary/notaries public
is/are certified to be correct.

Deputy - Assistant - Register of Deeds

Johnston County 06-11-2003
NORTH CAROLINA
Real Estate
Excise Tax [redacted]

FILED	Jun 11, 2003
AT	11:50:00 am
BOOK	02473
START PAGE	0365
END PAGE	0367
INSTRUMENT #	31864

NORTH CAROLINA GENERAL WARRANTY DEED

Excise Tax: [redacted]

Parcel Identifier No. _____ Verified by _____ County on the ____ day of _____, 20__
By: _____

Mail/Box to: Return to
This instrument was prepared by: William P. Aycock II, Attorney, P.O. Box 21847, Greensboro NC 27420
Brief description for the Index: _____

THIS DEED made this 11th day of June, 2003, by and between

GRANTOR	GRANTEE
JOSEPH FRANKLIN SCOTT, SR. and wife, BARBARA OWENS SCOTT	RESTORATION SYSTEMS, LLC, a North Carolina limited liability company 1101 Haynes Street, Suite 203 Raleigh, North Carolina 27604

Enter in appropriate block for each party: name, address, and, if appropriate, character of entity, e.g. corporation or partnership.

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in the City of _____, Beulah Township, Johnston County, North Carolina and more particularly described as follows:

SEE EXHIBIT "A" ATTACHED HERETO AND INCORPORATED HEREIN BY REFERENCE.

This conveyance does not include the right to any crop allotments, which allotments are retained by the Grantors.

The property hereinabove described was acquired by Grantor by instrument recorded in Book 916 page 625.

A map showing the above described property is recorded in Plat Book _____ page _____.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And the Grantor covenants with the Grantee, that Grantor is seized of the premises in fee simple, has the right to convey the same in fee simple, that title is marketable and free and clear of all encumbrances, and that Grantor will warrant and defend the title against the lawful claims of all persons whomsoever, other than the following exceptions: Restrictions, rights-of-way and easements of record, and to ad valorem taxes for the current year.

IN WITNESS WHEREOF, the Grantor has duly executed the foregoing as of the day and year first above written.

_____ (Entity Name)

By: _____ Title: _____

By: _____ Title: _____

By: _____ Title: _____

USE BLACK INK ONLY

Joseph Franklin Scott, Sr. (SEAL)
Joseph Franklin Scott, Sr.

Barbara Owens Scott (SEAL)
Barbara Owens Scott

_____ (SEAL)

_____ (SEAL)

USE BLACK INK ONLY

State of North Carolina - County of Greensboro

I, the undersigned Notary Public of the County and State aforesaid, certify that Joseph Franklin Scott, Sr. & wife, Barbara Owens Scott personally appeared before me this day and acknowledged the due execution of the foregoing instrument for the purposes therein expressed. Witness my hand and Notarial stamp or seal this 11 day of June, 2003.

My Commission Expires: 10-11-03 Dickie G. Batten
Notary Public

NOTARY PUBLIC
OFFICIAL SEAL
DICKIE G. BATTEN
GUILFORD COUNTY, NC
My Commission Expires 10-11-03

USE BLACK INK ONLY

State of North Carolina - County of _____

I, the undersigned Notary Public of the County and State aforesaid, certify that _____ personally came before me this day and acknowledged that he is the _____ of _____, a North Carolina or _____ corporation/limited liability company/general partnership/limited partnership (strike through the inapplicable), and that by authority duly given and as the act of each entity, he signed the forgoing instrument in its name on its behalf as its act and deed. Witness my hand and Notarial stamp or seal this _____ day of _____, 20__.

My Commission Expires: _____
Notary Public

USE BLACK INK ONLY

State of North Carolina - County of _____

I, the undersigned Notary Public of the County and State aforesaid, certify that _____

Witness my hand and Notarial stamp or seal this _____ day of _____, 20__.

My Commission Expires: _____
Notary Public

The foregoing Certificate(s) of _____ is/are certified to be correct.
This instrument and this certificate are duly registered at the date and time and in the Book and Page shown on the first page hereof.

_____ Register of Deeds for _____ County

By: _____ Deputy/Assistant - Register of Deeds

EXHIBIT "A"

BEGINNING at an iron pipe set near the southern bank of the Little River, which iron pipe is located the following courses and distances from an existing iron pipe within the right-of-way of Lowell Road (N.C. State Road #2335), the southwesternmost corner of the property shown on Plat Book 59, Page 381, Johnston County Registry: South 66° 15' 00" East 36.58 feet to an iron pin set; North 71° 39' 53" East 127.69 feet to an iron pin set; North 20° 14' 59" East to an iron pin set; North 69° 45' 01" West 17.0 feet to the point and place of BEGINNING; thence from said beginning point, crossing the Little River, North 20° 14' 59" East 278.00 feet to a non-monumented corner; thence South 69° 45' 01" East 117 feet to a non-monumented corner; thence crossing the Little River, South 20° 14' 59" West 278 feet to an iron pin set near the southern bank of the Little River; thence North 69° 45' 01" West 100 feet to an iron pin set; thence North 69° 45' 01" West 17.0 feet to the point and place of BEGINNING and containing .75 acres, more or less, and as shown on a survey for Restoration Systems, LLC, prepared by K2M Design Group, P.A., dated March 5, 2003 (DWG. NO:RRS364MR03).

TOGETHER WITH a 100-foot permanent non-exclusive easement for ingress, egress, regress, general utility and construction purposes more particularly described as follows: BEGINNING at an iron pin set in the eastern right-of-way of Lowell Road (N.C. State Road #2335), which iron pin is located North 25° 30' 08" East 434.77 feet from an existing P.K. nail located at the intersection of the center line of Lowell Road (N.C. State Road #2335) and Bagley Road (N.C. State Road #2339); thence from said beginning point, North 71° 39' 53" East 207.56 feet to an iron pin set; thence North 71° 39' 53" West 65.11 feet to an iron pin set; thence North 20° 14' 59" East 60.63 feet to an iron pin set, the southeastern corner of the property described above; thence with the southern line of the above-described property, North 69° 45' 01" West 100.0 feet to an iron pin set; thence South 20° 14' 59" West 12.48 feet to an iron pin set; thence South 71° 39' 53" West 127.69 feet to an iron pin set; thence South 71° 39' 53" East 20.40 feet to an iron pin set in the eastern margin of Lowell Road (N.C. State Road #2335); thence with the eastern margin of Lowell Road, the following courses and distances: South 04° 01' 02" West 10.77 feet to an iron pin set; South 16° 23' 04" West 44.61 feet to an iron pin set; South 22° 59' 04" West 71.08 feet to the point and place of BEGINNING and containing .56 acres, more or less, and as shown on the same survey described above.

APPENDIX J

PRELIMINARY FINDINGS REPORT
EDDY ENGINEERING, P.C.

PRELIMINARY FINDINGS REPORT

LOWELL DAM REMOVAL

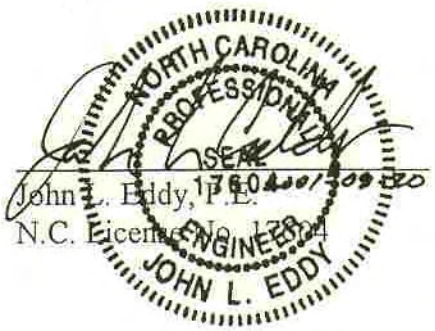
JOHNSTON COUNTY, NORTH CAROLINA

Prepared for:

Mr. George A. Howard
Restoration Systems, LLC
1101 Haynes Street, Suite 203
Raleigh, NC 27604

August 20, 2001
Project 2001-015

EDDY ENGINEERING, P.C.
302 North Plantation Lane
Swansboro, North Carolina 28584
(910) 325-1888
Fax (910) 325-1503



John L. Eddy, P.E.
N.C. License No. 17604

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1.0 INTRODUCTION

This report presents our preliminary findings of permitting issues and evaluation of project feasibility from an engineering perspective.

1.1 Purpose

The purpose of this study is to assist Restoration Systems, LLC, in evaluating the feasibility of river restoration plans along the Little River by removal of Lowell Dam. Our preliminary findings address the North Carolina Dam Safety Act of 1967 and Title 15A, Subchapter 2K of the North Carolina Administrative Code (NCAC 15A, 2K), the North Carolina Sedimentation Pollution Control Act of 1973, the National Pollutant Discharge Elimination System (NPDES) as administered by the NPDES Unit of the North Carolina Division of Water Quality, and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) as described herein. Other evaluations may be needed, but are beyond our current scope of services. Eddy Engineering, P.C., was contracted to provide preliminary evaluations of permitting issues for the above referenced agencies, and of project feasibility from an engineering perspective.

1.2 Project Location and Description

Lowell Dam is located on the Little River in Johnston County, North Carolina. The dam is located approximately 1,200 feet east of the intersection of SR 2144 and SR 2335, immediately south of Interstate 95. See Figure 1. The dam appears on the USGS topographic map "Kenly West" (7.5 Min. Series).

The dam consists of a mass concrete gravity spillway structure approximately 210 feet in length with an abandoned concrete mill structure near the right abutment (in this report left and right are referenced while facing downstream). We estimate the structural height of the dam at approximately 9 feet, not including the foundation thickness which is currently unknown. The spillway structure itself appears in generally good condition. (See photograph 1) With the water surface at normal pool elevation, water can be seen flowing through sections of the remaining mill foundation, and at the right abutment contact, draining to the pool at the toe of the spillway. (See Photographs 2 through 4) An existing site plan is presented on Figure 2.

1.3 Authorization

These services were authorized by acceptance of Eddy Engineering, P.C., Proposal 2001-015, by Mr. George A. Howard.

1.4 Scope of Services

Our scope of services for this report consisted of preliminary evaluations of project feasibility and of permitting issues. Eddy Engineering, P.C., provided the following professional services:

1. Performed a characterization and orientation site visit.
2. Obtained public information regarding the dam and lake. Readily available records of NCDENR, FEMA, and USGS were reviewed.
3. Performed a limited, preliminary evaluation of flood flows and stages for the dam and for the river without the dam.
4. Performed preliminary sediment characterization by a limited engineering survey.
5. Prepared a preliminary, order-of-magnitude estimate of retained sediment below normal pool.
6. Contacted representatives of NCDENR to explore permit requirements and sediment issues.
7. Evaluated dam configuration and construction for possible removal or modification alternatives and methods.
8. Prepared an engineering report documenting our findings and evaluations.

Additional services will be needed to fully evaluate required permits, project requirements, sediment character and quantity, and to design the proposed modifications to or removal of the dams.

1.5 Site Data Collection

Site elevation and structure data was collected by Eddy Engineering, P.C., during a limited engineering transit-stadia survey on May 31, 2001. Supplemental elevations used during our evaluation of the site were developed based on available topographic maps.

While on site, we also performed a waterborne reconnaissance of the upstream reach, terminating downstream of the bridge crossing at SR 1934. We estimate a total river distance of approximately 5 miles was traveled during our reconnaissance.

Collection of additional, specific, topographic site survey data will be required prior to completion of the final design efforts.

2.0 AGENCY CONTACT AND REGULATION REVIEW

Regulatory agency contact and regulation review were limited to the following agencies; NCDENR Land Quality Section (Dam Safety, and Erosion and Sediment Control), NCDENR Water Quality Section (NPDES Unit, Division of Water Quality), U.S. Army Corps of Engineers (USACE), Wilmington District, and the Federal Emergency Management Agency (FEMA). Coordination with agency representative is recommended early on in the planning and design process to reduce the potential for delays in the approval process.

2.1 Dam Safety

A review of the State Dam Safety database, maintained by the North Carolina Department of Environment and Natural Resources (NCDENR), indicates that the dam is not listed as a regulated dam. Based on our assessment of the structural height and hazard potential, it is our opinion that the dam is exempt from the design and construction requirements of NCAC 15A 2K, as amended. Final determination of the regulatory status is at the discretion of the Director of the Division of Land Resources.

While the dam may be exempt, notification of the State Dam Safety office prior to any modification is still required. Based on discussions with NCDENR, a dam breach plan will be required to be submitted. Only upon approval of the plan can the removal of some or all of the dam be performed.

Application fees for construction or removal of a dam currently consist of a $200.00, non-refundable, application processing fee submitted with the plan. Additional processing fees, currently not to exceed $50,000 are due upon completion of dam removal. The fees beyond the initial application fee are a graduated percentage of the actual costs of labor and materials associated with the removal of the dam.

2.2 Sediment and Erosion Control

The submission of a Sediment and Erosion Control plan is required if the surface area disturbed during construction is greater than one acre. The exposed lake bed area will exceed one acre; however, based on discussions with a representative of the NCDENR, Land Quality Section, the plan itself would only be required to address the immediate vicinity of the dam that is disturbed during dam removal activities.

It is unlikely that the disturbed surface area would exceed the one acre threshold for dam removal alone; however, if any other areas are disturbed as part of construction, the one acre threshold could be exceeded. The use of sediment and erosion control devices to keep sediment out of streams, rivers, and lakes is required by law, whether or not a plan is required.

Processing fees associated with the review of a sediment and erosion control plan include a non-refundable application processing fee submitted at the time of the sediment and erosion control plan. Processing fees consist of a $30.00 fee for the first acre of disturbed land, and an additional $20.00 fee for each additional acre, or any part thereof, to be disturbed during construction. This acreage normally includes acreage of any borrow or waste areas associated with the construction.

The property Owner or financially responsible party is required to submit and receive approval of a sediment and erosion control plan prior to initiating land disturbing activities. The plan is required to be followed until land disturbing activities are completed and a permanent groundcover is established.

2.3 NPDES Unit of DWQ

The NPDES Unit of the Division of Water Quality regulates point source discharges to surface waters. There is one listed point source discharge into the lake retained by the dam, the Town of Kenly Waste Water treatment Plant (WWTP). Two other sources are listed as discharging into the Little River in Johnston County, a public school near Zebulon and the Town of Princeton WWTP.

Based on discussions with NPDES Unit staff, dam removal should not be affected by the presense of a discharge point within the lake. Generally, dam removal would only be an issue if there were required minimum streamflow releases from a dam upstream of a discharge point. In this case, some modification may be required to the outlet of the discharge line. Currently the discharge line has a vertical riser set just above normal pool. This may need to be extended to the new water line. Without extension, treated discharge may have to flow overland to reach the river.

2.4 FEMA

The National Flood Insurance Act was passed in 1968 to created the National Flood Insurance Program (NFIP). The purposes were to reduce future flood losses through local flood plain management and to provide protection for property owners against potential losses through flood insurance. The NFIP requires the participating community to adopt flood plain management ordinances. The community also must submit data to the Federal Emergency Management Agency (FEMA) reflecting revised flood hazard information, so that NFIP maps can be revised as appropriate.

Based on discussions with representatives of both the U.S. Army Corps of Engineers (USACE), Wilmington District, and the Federal Emergency Management Agency (FEMA), Atlanta Office, engineering analysis will be required to determine what, if any, effect the removal of all or a portion of the dam will have on water surface profiles and the currently mapped flood hazard areas. According to both offices, any changes of water surface profiles and associated flood

hazard areas as a result of the dam's modification or removal are required to be documented and submitted through Johnston County, NC, to FEMA so that they may issue a Letter of Map Revision (LOMR). Through this process, the existing flood maps can be revised to accurately reflect the changes. Typically, an application for a Conditional Letter of Map Revision (CLOMR) is submitted based on design data. Approval of the CLOMR must be received, prior to construction. Then, once construction is complete, and "as-built" data confirming its consistency with design data is collected, a LOMR application is submitted showing the new site conditions. From this new set of conditions, water surface profiles, and flood hazard areas, published FEMA maps are revised.

We obtained a copy of the current flood study models, water surface profiles, and flood hazard mapping associated with the project area from the USACE, Wilmington District office. A review of the this information was performed, and a preliminary analysis of water surface profiles with the dam removed was made. Additional information regarding our review and preliminary analysis is included in Section 4 of this report. While our preliminary analyses described in Section 4 of this report do not indicate a change in base flood elevations as a result of dam removal, the effective model needs to be updated to reflect the changes, so that any future modeling or revisions will be accurate. Also, our preliminary model needs to be revised with actual cross-sections for the site after dam removal and also reflecting any other changes that may be made.

Review fees for the CLOMR/LOMR process depend on whether the project falls under "Channel modification, new bridge or culvert, or combination" or "Levees, berms, or other structural modifications." The review fee range appears to be $4,000 to $4,700.

3.0 SITE OBSERVATIONS AND EVALUATION

The following evaluations are based on site observations, limited site data collection, and experience with similar projects.

3.1 Near Dam Observations

Lowell Dam consists of a mass concrete gravity spillway structure approximately 210 feet in length. At the right abutment (in this report left and right are referenced while facing downstream), the foundation of an abandoned concrete mill structure remains between the near end of the spillway and the rock contact. The structural height of the dam is estimated at approximately 9 feet. This height does not include the spillway foundation thickness. Without further investigation, the size and condition of the spillway foundation and abutment contacts remain unknown. The spillway structure itself appears in generally good condition.

In the immediate vicinity of the spillway (upstream and downstream) the right bank of the river is rock bound with no apparent active flood plain. The left bank however appears to be largely comprised of deposited sediment, and appears to have an active flood plain. Both the left and right banks, both upstream and downstream of the dam structure, are heavily vegetated and appear relatively stable. There is, however, evidence of historic scour of the flood plain on the left side visible downstream of the dam.

3.2 Upstream Observations

During our site visit, a waterborne reconnaissance of the upstream reach was performed. The reconnaissance started at the dam and terminated downstream of the bridge crossing at SR 1934, a travel distance of approximately 5 miles. Over this length significant variations in the river occur. At some locations the river appears incised, with rock bound banks on one or both sides, and no apparent flood plain. In other locations, active flood plains are evident on one or both sides of the river.

While the watershed hydrology is influenced by the watershed being partly in the Coastal Plain, the river morphology is generally that of a Piedmont river. Throughout the majority of the reach, exposed rock is visible on one or both banks or is present in the river bottom.

Local topography varies significantly over the reach we visited. Significant backwater and ponding appear along the reach, which is likely an effect of the dam. With the removal of the dam structure, it is possible that many of the areas currently inundated by the backwater effects of the dam will see significantly lower, surface water levels.

During our site visit, we attempted to discern the approximate location at which the dam ceased to impact flow along the river channel. Although it is difficult to pinpoint an exact location, we did observe a location where channel flow first went from sub-critical to super-critical flow. This transition from sub-critical to super-critical flow velocity is the upstream limit of backwater effects. It is at this location where the depth and velocity of flow is a result of the natural channel dimension, slope, and roughness alone, rather than the combined effect of a downstream control mechanism such as a dam and the foregoing factors. The first super-critical flow we encountered was approximately 4.5 miles upstream of the dam. This compares favorably with the point at which such conditions would be expected, based on the available FEMA FIS stream invert data, which is about 5 miles. Distances from our visual reconnaissance were estimated by observing existing land features and comparing them to mapped features. It is expected that in a dynamic river system such as the Little River, this point would shift upstream and downstream in time based on flow and sediment load conditions.

The location of the first super-critical flow will also vary considerably depending on the stage of the river, the associated discharge frequency, and local topography. If the dam were to be removed, determination of the extent of the upstream effect, and the associated length of restored channel, would depend on the flood recurrence interval accepted for this determination.

During our reconnaissance, we observed a sewer effluent discharge pipe entering the river at the US 301 bridge. The pipe is discharge from the Kenly WWTP, discussed in Section 2 of this report.

3.3 Preliminary Retained Sediment Evaluation

There does not appear to be a large volume of sediment retained within the main channel, below normal pool. Our limited engineering survey did not include soil test borings to determine sediment volumes in areas above normal pool. In the areas we probed below normal pool, little or no sediment accumulation was observed.

Probings at the dam and continuing several hundred feet upstream indicated that the lake bottom was rocky and at approximately the same elevation upstream of the dam as downstream of the dam. This indicates that flow velocities are high enough to cause scour and self-armoring of the stream, even with the dam in place. Our water surface profile analyses confirm relatively high velocities within the reach upstream of the dam.

This type of morphology is common with "run of the river" dams. "Run of the river" dams have a level pool only during very low flow periods. During larger flows, the velocities are high enough to cause scour of the main channel and the lake area has no still pool.

Sediment deposition upstream of the dam appears to be primarily in the overbank flood plain areas above normal pool. Significant sediment deposition is present in the flood plain upstream of the spillway structure along the left channel bank Here the flood plain is present at higher elevations than downstream of the dam. The effect of this sediment is that the channel near the dam will be somewhat incised after removal of a part of the dam. Therefore, it would be reasonable to keep that portion of the dam that is retaining sediment as a flood plain grade control structure. With a grade control structure at its terminus, mobilization of this sediment appears unlikely. This sediment is well stabilized with woody vegetation. Many of the trees in these areas appear to be decades old.

Immediately downstream of the dam, there appears to be a scoured area of the former flood plain along the left side of the dam. This probably resulted form impinging flows over the dam, plus the loss of normal sediment load that was deposited in the flood plain area immediately upstream of the dam. With the channel portion of the dam removed, we would expect this area to become an aggradation area, as flows here would be slightly less frequent and would be directed along the channel. At a distance of approximately 200 feet downstream, the channel appears to be in a more natural condition with well vegetated banks and little indication of sediment deposition or starvation. This further confirms that the majority of the sediment load has been historically passed over or through the dam.

4.0 HYDROLOGIC AND HYDRAULIC REVIEW AND ANALYSES

As described previously, a review of available flood study data, models, water surface profiles, and flood hazard mapping was necessary to understand existing site conditions. Additionally, a preliminary analysis of future conditions was needed to approximate post-restoration conditions, including the removal of a portion of the dam. We also performed a general hydrologic review of the contributing watershed. A summary of our findings is presented in this section.

4.1 Watershed Description

The contributing drainage area to Lowell Dam is approximately 215 square miles, as delineated by us on the USGS topographic maps (7.5 Min. Series, Quadrangles). For comparison purposes, we looked at the drainage area associated with two USGS Stream Gauges on the Little River. The two gauges were USGS 02088470 (Little River near Kenly, NC) upstream of Lowell Dam, and USGS02088500 (Little River near Princeton, NC), downstream of the dam. The contributing drainage areas to the Kenly and Princeton gauges were 191 square miles and 232 square miles respectively.

4.2 Current Flood Insurance Study

A Flood Insurance Study (FIS) was originally completed for the subject river reach in Johnston County, North Carolina and Incorporated Areas, on October 20, 2000. As part of our contracted scope of services, we reviewed the current flood study data as provided by USACE, Wilmington Regional Office to the Federal Emergency Management Agency (FEMA). The following information was provided by USACE and reviewed by us for this preliminary evaluation:

- HEC-2 Input and Output Data Files
- Portions of the October 2000 Johnston County, North Carolina and Incorporated Areas Flood Insurance Study report, including a hydrology and hydraulics write-up, discharges, floodway data table, and flood profiles
- Photocopies of Panels 255, 260, and 270 of the October 2000 Flood Insurance Rate Map
- Photocopies of the pertinent Combined Work Maps, as sent to FEMA

This study identifies five confluence points along the Little River, a tributary of the Neuse River. Those confluences are, from downstream to upstream; Above Spring Branch, Above Little Creek, Above Little Buffalo Creek, Above Buffalo Creek, and Above Long Branch. These confluence points have contributing drainage areas of 249.0, 229.0, 191.0, 129.0, and 112.0 square miles respectively.

4.3 Hydrologic Analyses

According to the FIS, the USACE HEC-1 (incorrectly noted as HEC-2 in the report) Flood Hydrograph Package was used for the development of peak watershed discharges. The Soil Conservation Service (SCS) dimensionless unit hydrograph method was used as the means of calculating the hydrograph for each sub-basin. Additionally, the report noted that the normal depth channel routing was used as the routing methodology, and that raw data for drainage areas, curve numbers, lag time, and routing time were obtained from USGS Quadrangle maps. It also was noted that hypothetical storm information was obtained from the National Weather Service (NWS) Technical Paper No. 40 (TP-40).

Peak discharge and key confluences along the Little River as reported in the FIS are as follows:

FLOODING SOURCE AND LOCATION	Drainage Area (sq. mi.)	10-Year Peak (cfs)	50-Year Peak (cfs)	100-Year Peak (cfs)	500-Year Peak (cfs)
Above Spring Branch	249.0	6,150	11,200	14,100	23,800
Above Little Creek	229.0	5,900	10,900	13,800	23,000
Above Little Buffalo Creek	191.0	5,400	10,100	12,900	22,000
Above Buffalo Creek	129.0	4,400	8,600	11,000	19,500
Above Long Branch	112.0	4,050	8,100	10,500	18,900

Lowell Dam is situated between the confluence of Little Buffalo Creek in the north, and Little Creek in the south. Based on our original delineation of the contributing watershed at the dam of approximately 215 square miles, we would then estimate the 10-, 50-, 100-, and 500-Year peak discharges to be between those listed in the table above for Little Creek and Little Buffalo Creek for the listed recurrence intervals.

4.4 Hydraulic Analyses

In order to understand the effect that Lowell Dam has on the water surface profiles for the study reach, we reviewed FIS data to include the Floodway Data Table (see attached Table 3), the Flood Profile (see attached Figure 26P), and both the HEC-2 input and output models.

Lowell Dam is depicted at Cross-section U (Station 1835+30) as shown on the Floodway Data Table and Flood Profile. Using the HEC-2 input data model provided by USACE, we created a modified version with two cross-sections (Station 1835+30 and 1835+32) removed. These cross-sections depict Lowell Dam with a crest length of 189.00 feet at an elevation between 130.30 feet and 130.50 feet. We also modified the cross-section data to reflect the correct channel length and roughness coefficients without the dam cross-sections. Predicted water surface elevations (W.S.E.) for the design floods of interest for the cross-section immediately upstream of the dam spillway (Station 1835+33) for both the current FIS and our preliminary revisions did not change. The computed W.S.E's are depicted in the following table:

Flood Recurr. Interval	Current FIS Data W.S.E. (ft.)	Preliminary Revisions W.S.E. (ft.)
10-Year	138.10	138.10
50-Year	141.74	141.74
100-Year	143.30	143.30
500-Year	146.71	146.71

At first glance this situation might seem unusual. However, the majority of the cross-sectional flow area is above the spillway elevation for the indicated recurrence intervals. More frequent events could be expected to vary between the Current FIS and our model with preliminary revisions.

Under our current scope of services, we do not have the data to estimate the extent of backwater effects of the dam for more frequent events. With the appropriate data, it would be possible to estimate the backwater effects of the dam during key events, such as the 2-year recurrence interval flood. In this case, the FIS relied upon synthetic hydrology and we did not have the data (HEC-1 input files) for more frequent events. It was not possible to reliably extrapolate flow data to obtain the needed values. Also, we observed that the cross-sections used in the study, while valid for the purposes of the FIS, may lack sufficient detail to reliably predict WSE's in more frequent events.

As such, additional study would be needed to determine the potential backwater effects of the dam during flood events. The extent of backwater effects under higher frequency events would extend further upstream than observed under low-flow conditions. We have previously reported the potential backwater effects as observed during our visual reconnaissance and based on the invert of the cross-sections used in the FIS.

Our preliminary analyses indicate that there is no change in the base flood elevation as a result of dam removal; however, these analyses are preliminary and our model needs to be revised with actual cross-sections for the site after dam removal. Revisions to the effective model should be made so that future modeling and mapping accurately reflect actual stream conditions.

5.0 DAM REMOVAL

This section presents our evaluation of the engineering means by which the dam could be removed, how much of it should be removed, and other design and construction issues.

5.1 Extent of Removal

The dam should be removed to the approximate cross-section of the stream channel immediately upstream of the dam. This will help to retain the sediment already stabilized in the flood plain area immediately upstream of the dam. Because of the exposed rock in the channel bed, it should not be necessary to remove the structures below the proposed channel invert, if present. All exposed reinforcing steel should be cut flush and removed.

Normally, dams of this type are designed as two-dimensional structures. This means that any section of the dam, taken from upstream to downstream, should be stable on its own. It is not dependant on three-dimensional effects for stability. The design basis for Lowell Dam is not known. It is likely that three-dimensional effects would be small, based on the dam cross-section and length; however, stability of the remaining sections of the dam should be confirmed by engineering analysis.

5.2 Means of Removal

The relatively large mass of the dam section should be removed by controlled demolition. We do not recommend use of explosives. Explosives might damage the portion of the structure to remain.

Controlled demolition can likely be achieved with a combination of diamond wire sawing and hydraulic breaking. Construction should begin by dewatering the retained lake as much as possible by removing flash boards and other water control structures within the old mill house foundation. Once water is diverted through the old mill house, and the lake surface has dropped, a cut should be made along the proposed edge of the structure to remain. This cut should be made at an angle or stepped to conform approximately to the upstream channel bank. The remainder of the structure, to include the mill house foundation could then be removed by hydraulic breakers down to the proposed channel invert. Construction must be performed during a period of relatively low flow to reduce the need for water control and diversion during demolition. Specific design plans for the demolition should be prepared for regulatory review and to serve as contract documents for the work.

6.0 LIMITATIONS

This report was prepared subject to acceptance of our proposal, which includes our "Standard Terms for Engagement." Our evaluations, conclusions, and recommendations are based on project and site information available to us at the time of this report and may require modification, if there are any changes in the project or site conditions, or if additional data about the project or site becomes available in the future. Additional data will become available during final design and during construction as site and project conditions are further investigated or exposed by construction. This report is intended for use by our client on this project as identified on the cover. These findings are not intended or recommended to be suitable for reuse on extensions of the project or on any other project. Reuse on extensions of the project or on any other project shall be done only after written verification or adaptation by EDDY ENGINEERING, P.C., for the specific purpose intended. Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, expressed or implied, is made.

PHOTOGRAPHS

Photo 3: Mill Foundation

Photo 4: Downstream Leakage of Mill Foundation

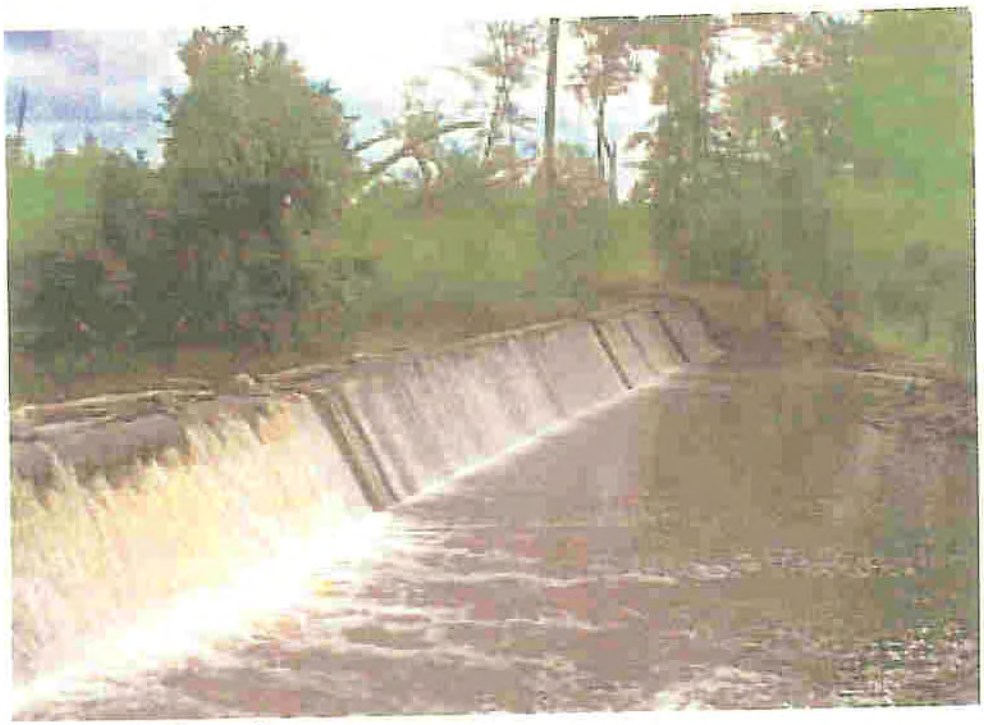
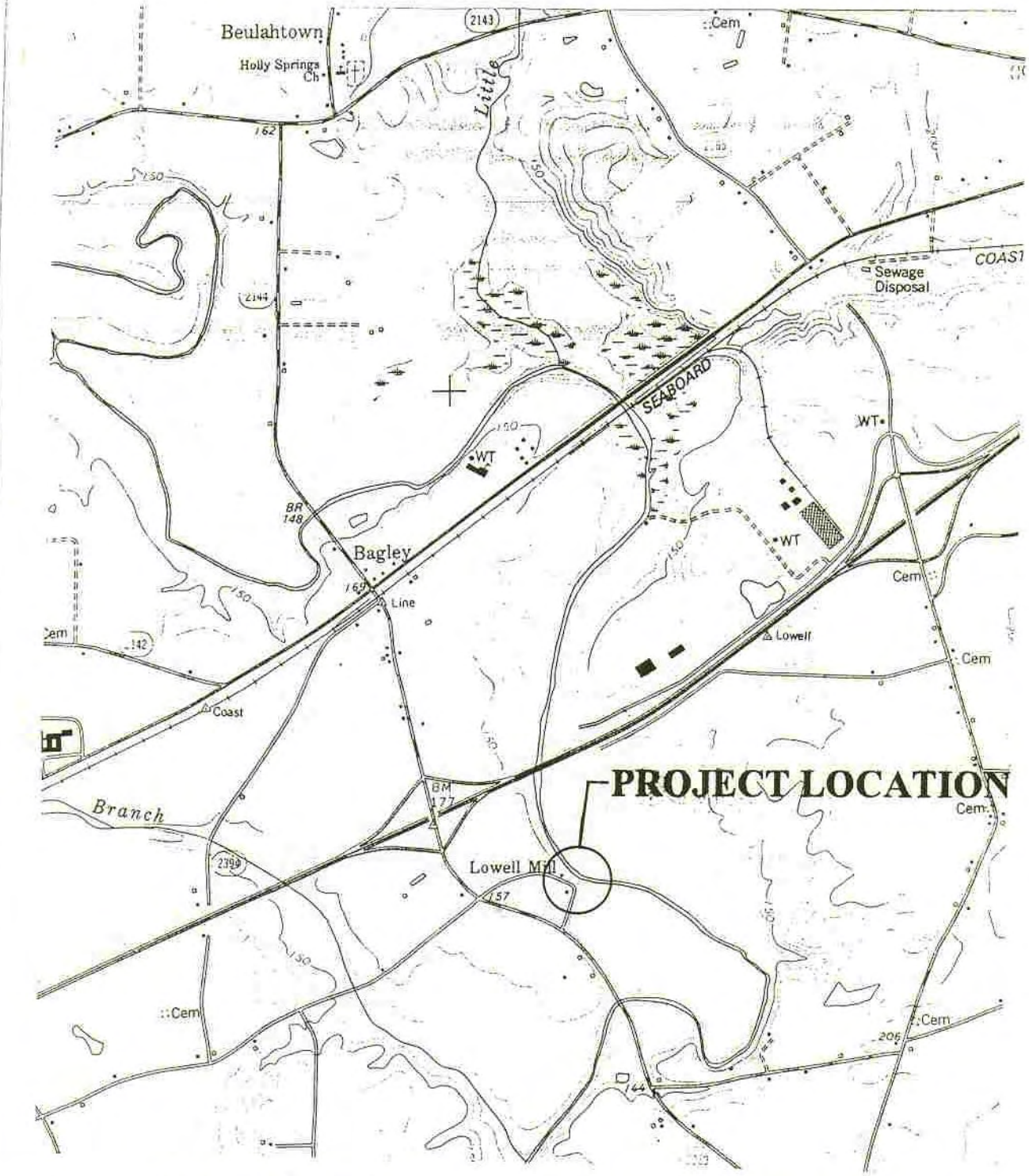


Photo 1: Spillway Structure

Photo 2: Mill Structure

FIGURES



Map taken from USGS 7.5–minute Quadrangle map
"Kenly West, NC"

Not to Scale

Restoration Systems, LLC Raleigh, North Carolina	LOWELL DAM REMOVAL Johnston County, NC	VICINITY MAP
EDDY ENGINEERING, P.C. 502 NORTH PLANTATION LANE, WILMINGTON, NC 28405 (910) 395-1800 FAX (910) 395-1803	Project No. 2001–015	August 2001 Figure 1

Restoration Systems, LLC Raleigh, North Carolina	LOWELL DAM REMOVAL Johnston County, NC	SITE PLAN
EDDY ENGINEERING, P.C.	Project No. 2001-015	August 2001 Figure 2

APPENDIX A

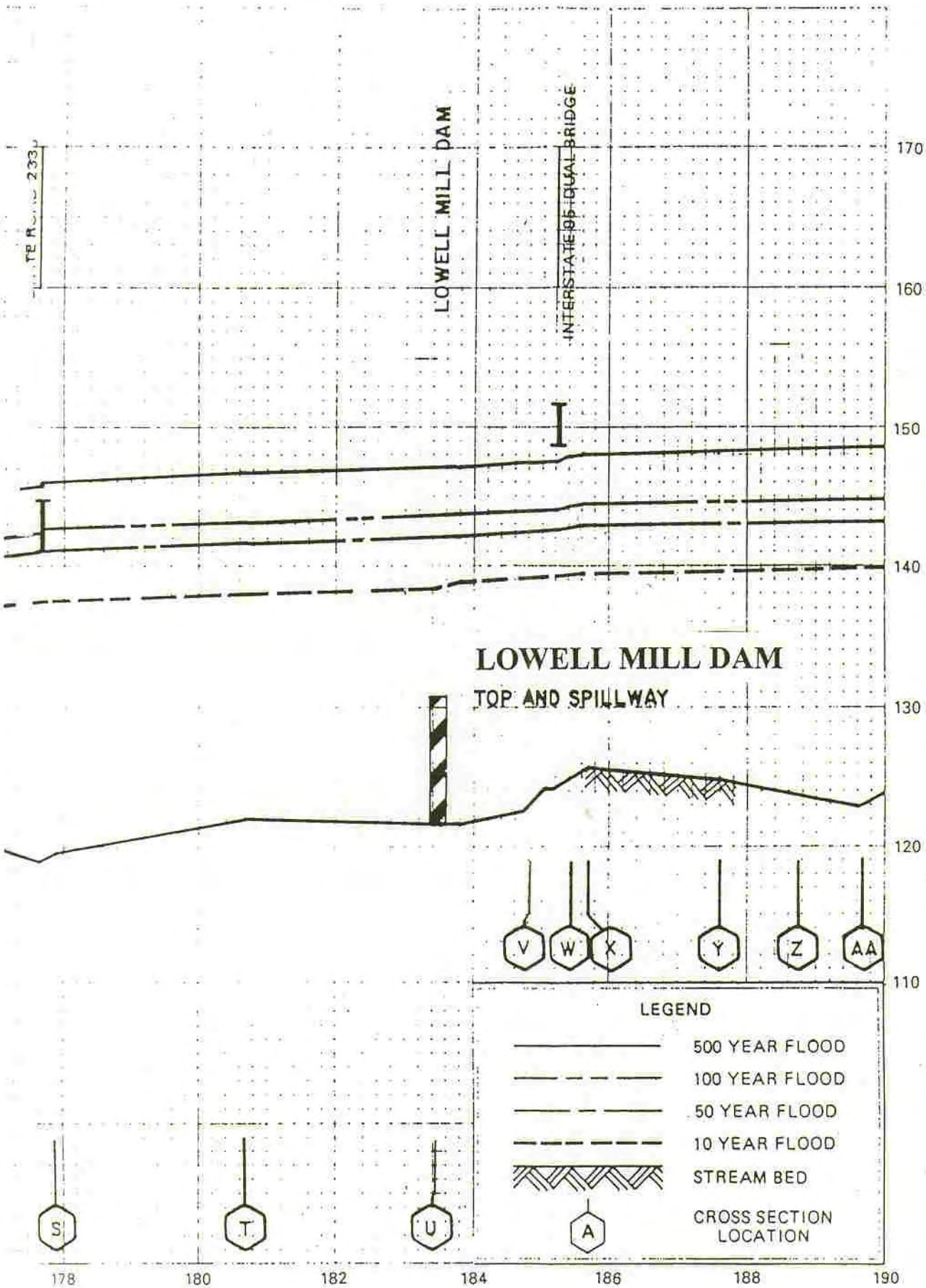
FLOOD INSURANCE STUDY

JOHNSTON COUNTY, NORTH CAROLINA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BENSON, TOWN OF	370504
CLAYTON, TOWN OF	370139
FOUR OAKS, TOWN OF	370502
JOHNSTON COUNTY (UNINCORPORATED AREAS)	370138
KENLY, TOWN OF	370501
PRINCETON, TOWN OF	370485
SELMA, TOWN OF	370499
SMITHFIELD, TOWN OF	370140
WILSON'S MILLS, TOWN OF	370262

OCTOBER 20, 2000

Federal Emergency Management Agency



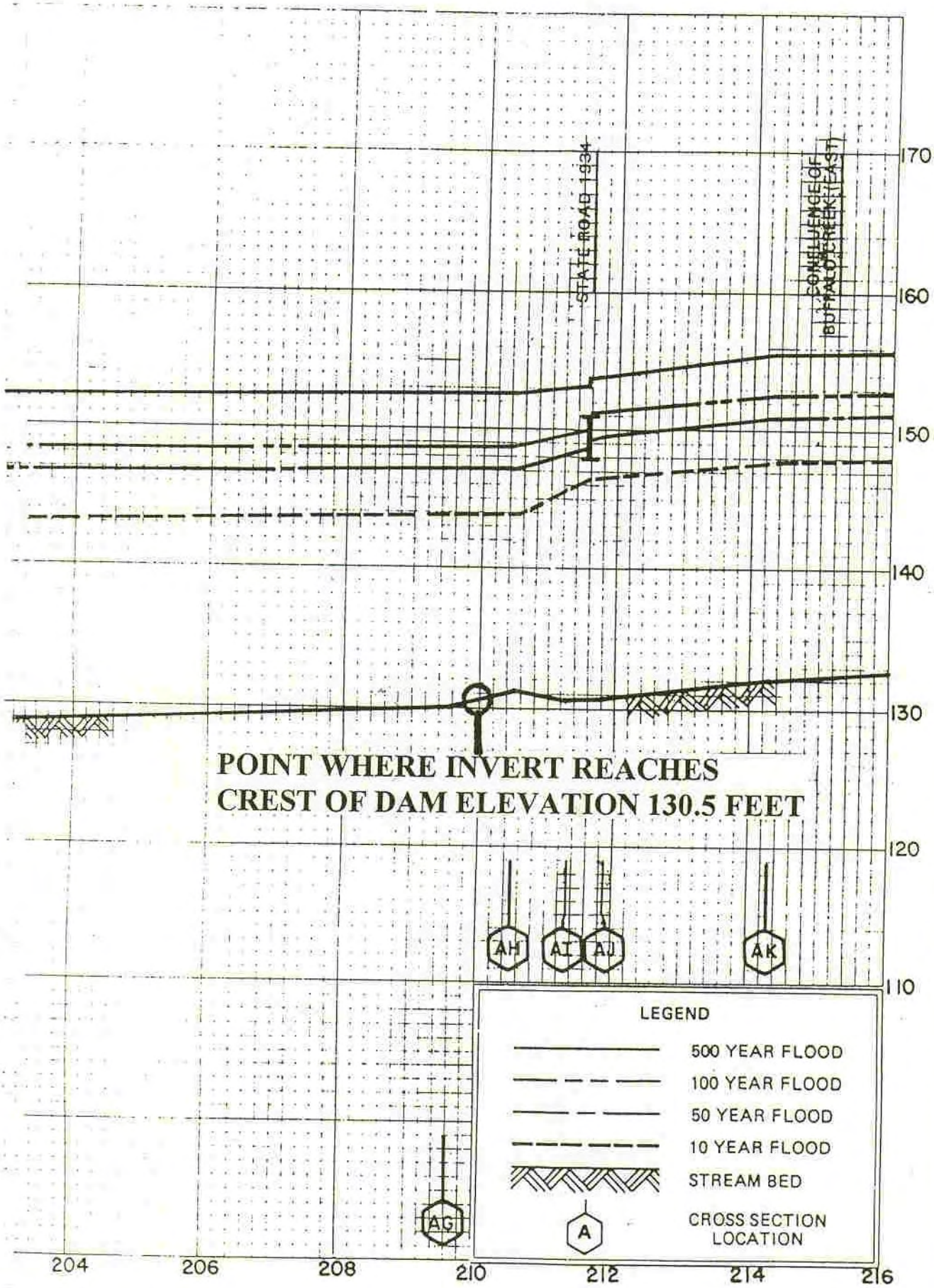
ANDS OF FEET ABOVE MOUTH

FLOOD PROFILES

LITTLE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSTON COUNTY, NC
AND INCORPORATED AREAS



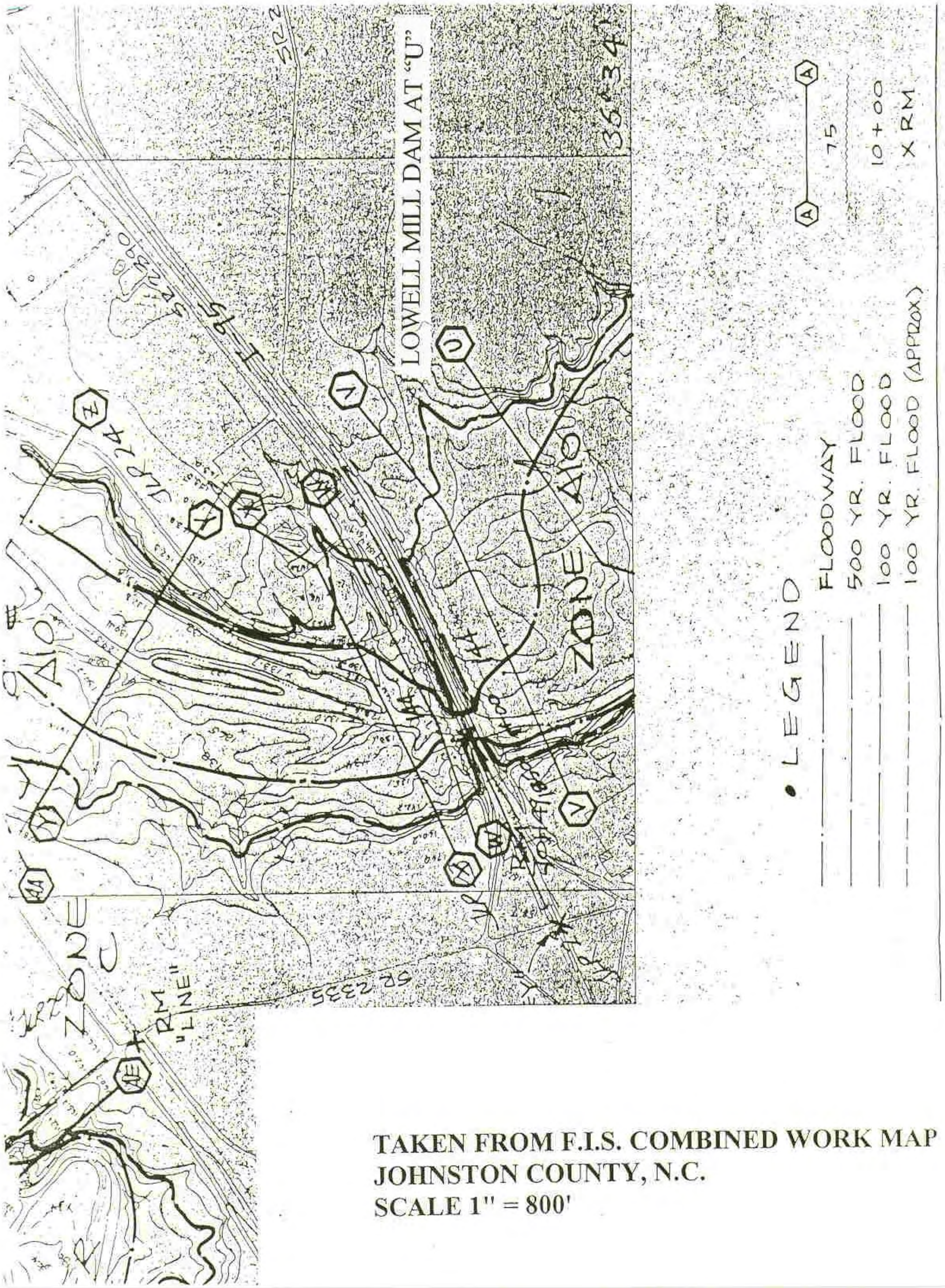
ANDS OF FEET ABOVE MOUTH

FLOOD PROFILES

LITTLE RIVER

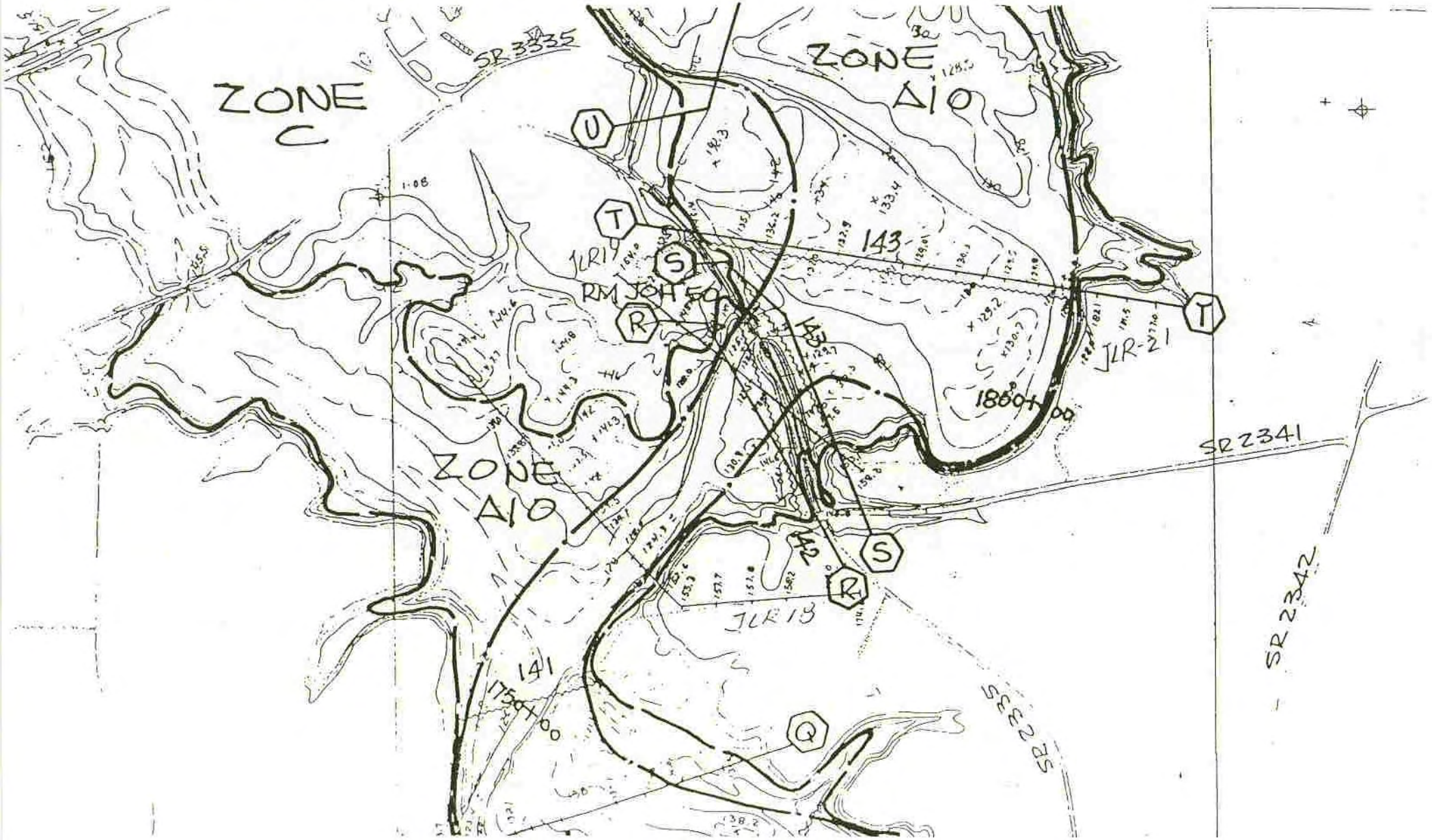
FEDERAL EMERGENCY MANAGEMENT AGENCY

JOHNSTON COUNTY, NC
AND INCORPORATED AREAS



TAKEN FROM F.I.S. COMBINED WORK MAP
JOHNSTON COUNTY, N.C.
SCALE 1" = 800'

LOWELL MILL DAM AT "U"



APPENDIX B

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*  Version  4.6.2:  May 1991        *
*                                   *
*  RUN DATE   17JUL01   TIME  08:40:19 *
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                                                  XXXXXXX  XXXX         X        XXXXX
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**********
HEC-2 WATER SURFACE PROFILES

Version  4.6.2:  May 1991
**********

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T2      10 YR NATURAL
T3      LITTLE RIVER

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                                                           61.60     .96

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE

    1                   -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

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        52        21        22        54         4         0       150       201

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ET                                                     9.11                         0940      1960
X1         1        10      1600      1660         0         0         0         0         0         0
GR        85         0      72.0        70      70.0       120      60.0       130      60.0       170
GR      64.0       290      64.0       400      62.0       470      60.0       540      60.0       670
GR      62.0       700      64.0       800      65.4       910      64.0      1020      62.0      1070
GR      60.0      1290      60.0      1300      57.0      1400      57.0      1500      54.5      1600
GR      48.5      1610      48.5      1650      54.5      1660      58.0      1900      60.0      1928
GR      62.0      1930      64.0      1960      65.1      2050      64.7      2200        85      2300

ET                   9.11      9.11      9.11                                       0660      2300
ET                                                     9.11                         0900      1940
X1       150                    0         0       150       150       150         0         0         0

ET                   9.11      9.11      9.11                                       0900      3000
ET                                                     9.11                         1040      2150
X1       300        25      1787      1858       150       150       150         0         0         0
GR        85         0      71.5       185      78.4       370      70.0       410      60.0       630
GR      62.7       710      60.0       820      60.0       950      65.4      1190      64.0      1380
GR      60.0      1550      57.2      1700      56.84     1717      53.5      1787      52.74     1800
GR      51.1      1805      48.9      1815      58.6      1818      57.6      1827      55.2      1837
GR      55.0      1846      58.5      1858      56.24     1862      57.94     2038      58.34     2078
1
  17JUL01     08:40:19                                                                PAGE    2

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ET                                                     9.11                         1578      2520
X1       900        31      2000      2075       600       400       400         0         0         0
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GR        85      3200

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GR      66.0       830      60.0       840      68.0       900      67.0       710      62.0       800
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GR      66.0      1240      67.2      1300      66.0      1320      64.0      1358      62.0      1380
GR      60.0      1400      56.0      1500      58.5      1525      58.5      1548      59.1      1592
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GR      62.0      2560      64.0      2588      66.0      2600      68.0      2610      70.8      3050

ET                   9.11                                                           0001      1500
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ET                                                     9.11                         1150      1590
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GR      70.0       930      68.0      1028      68.0      1067      66.8      1103      61.3      1118
GR      59.0      1127      58.9      1193      58.4      1200      52.2      1205      53.6      1214
GR      51.8      1225      51.8      1245      51.9      1252      52.7      1257      55.8      1268
GR      60.8      1300      61.1      1332      60.0      1348      60.5      1500      62.0      1700
GR      62.0      1940      62.0      2100      66.4      2400      71.4      2890        85      3200

ET                                       9.11                                       0001      1550
ET                   9.11      9.11      9.11                                       1150      1550
ET                                                     9.11                         1150      1550
X1      2535        30      1200      1275        30        30        30         0         0         0
GR        85         0      73       325      72.8       560      70.0       640      71.7       780
GR      70.0       930      68.0      1020      60.0      1100      63.0      1200      53.0      1250
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GR      62.0      1940      62.0      2100      66.4      2400      71.4      2890        85      3200
1
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ET                                                     9.11                         1100      1500
X1      2595        24      1100      1508        60        60        60         0         0         0
X3        10                                                                       71.0      76.0
GR        85         0      72       450      71.7       560      73.5       900      70.0      1000
GR      70.0      1010      65.5      1100      67.0      1101      54.0      1150      54.0      1250
GR      64.0      1310      64.4      1350      63.0      1500      61.3      1600      64.0      1800
GR      62.0      2000      64.0      2100      62.0      2200      66.0      2300      66.0      2400
GR      60.0      2800      70.0      2840      70.7      2970        85      3010

SA      1.95      1.50       2.5         0        76       6.0      2638      5.02         0         0
ET                                                     9.11                         1100      1500
X1      2655        28      1100      1500        10        10        10         0         0         0
X2                             1      69.6      71.7
X3        10                                                                       71.7      76.0
BT        17         0        85      69.6       450      72.0      69.6       660      71.7      69.6
BT      1010      76.7      69.6      1100      76.9      69.6      1230      76.9      69.6      1330
BT      76.8      69.6      1500      76.8      69.6      1600      76.7      69.6      1800      76.0
BT      69.6      2200      76.0      69.6      2300      76.0      69.6      2400      76.0      69.6
BT      2800      76.0      69.6      2840      76.0      69.6      2970      76.0      69.6      3010
BT        85      69.6
GR        85         0      72.0       450      71.7       560      70.0      1010      70.0      1020
GR      69.5      1100      66.99     1101      54.38     1142      53.2      1150      52.6      1175
GR      53.5      1200      53.5      1230      55.4      1238      59.78     1250      63.28     1300
GR      64.78     1325      63.68     1500      61.28     1600      64.0      1800      62.0      2000
GR      64.0      2100      62.0      2200      66.0      2300      66.0      2400      68.0      2800
GR      70.8      2840      70.7      2970        85      3010

ET                   9.1       9.1       9.1                                        1000      1425
ET                                                     9.1                          0001      1425
ET                                                     9.11                         1000      1425
X1      2615        24      1100      1325        10        10        10         0         0         0
GR        85         0      72.6       450      71.7       660      70.6       800      70.0      1010
GR      70.0      1070      70.0      1040      66.0      1100      66.98     1101      54.0      1156
GR      54.8      1250      64.8      1325      70.0      1490      61.28     1600      64.0      1800
GR      62.8      2000      64.6      2100      62.0      2200      66.0      2300      66.0      2400
GR      68.0      2800      70.8      2840      70.7      2970        85      3010

ET                   9.1       9.1       9.1                                        1000      1509
ET                                                     9.1                          0001      1500
ET                                                     9.11                         1050      1500
X1      2675        21      1200      1380        60        60        60         0         0         0
GR        85         0      72.8       290      72.8       530      72.0       630      70.0       880
GR      68.0       890      66.0       910      64.0      1060      60.0      1810      62.0      1200
GR      52.8      1215      52.8      1285      61.0      1300      61.0      1400      60.0      1620
GR      60.8      2000      62.0      2040      64.0      2180      66.0      2220      67.7      2460
GR        85      3000

ET                   9.1       9.1       9.1                                        0900      1560
ET                                                     9.1                          0001      1560
ET                                                     9.11                         1100      1560
1
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X1      2735        35      1191      1265        60        60        60         0         0         0
GR        85         0      72.8       470      72.8       530      72.0       570      71.1       830
GR      70.0       900      66.0       920      64.0       990      60.0      1010      61.3      1016
GR      56.0      1042      59.0      1075      60.2      1191      58.5      1200      57.4      1210
GR      59.5      1219      51.5      1248      52.3      1252      55.6      1258      53.7      1265
GR      58.6      1280      59.4      1311      58.7      1366      59.2      1410      60.1      1500
GR      60.0      1650      68.0      2010      62.0      2120      64.0      2150      66.0      2180
GR      67.7      2400      66.8      2690      68.0      2980      70.0      2860        85      2950

ET                                       9.11                                       0900      1600
X1      6400        73       981      1012      1860      1522      1665         0         0         0
GR        85         0      74.0      60.0      74.0       320      74.7       200      74.1       300
GR      75.0       500      61.8       840      65.3       923      60.8       885      58.5      1000
GR      52.2      1006      52.6      1016      51.3      1040      52.6      1048      58.8      1055
GR      67.4      1072      61.5      1100      61.1      1127      60.1      1158      60.0      1190
GR      58.9      1230      60.1      1268      62.0      1400      64.0      1420      66.0      1448
GR      68.3      1500      68.0      1600      65.3      1650      66.8      1690      61.7      1190
GR      66.0      1890      76.3      1958        85      2100
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ET                                                                  9.11                                    0960    1600
X1    5400        25      1300    1380    1310    1450    1300    0       0       0
GR    85          0       76.0    140     74.0    480     72.0    320     70.0    180
GR    68.0        810     66.0    850     64.0    950     62.0    1050    62.0    1060
GR    61.5        1330    53.5    1325    53.5    1365    64.5    1380    62.0    1630
GR    64.0        1660    66.0    1680    68.0    1770    70.0    1850    71.0    1900
GR    70.0        2130    70.0    2270    70.0    2360    70      2460    85      2300

ET                                                                  9.11                                    1500    2500
X1    7200        33      2000    2100    1300    1100    1300    0       0       0
GR    85          0       76.0    150     78.4    320     80.0    680     80.7    720
GR    80.1        940     80.0    970     78.0    1000    76.0    1030    74.0    1060
GR    72.0        1080    70.0    1100    68.0    1120    66.0    1140    64.0    1230
GR    61.0        1600    62.3    1800    60.2    1854    61.6    1900    62.8    2000
GR    54.6        2010    53.7    2017    53.3    2027    55.0    2045    56.3    2056
GR    62.0        2100    61.0    2165    62.5    2225    61.8    2280    64.0    2400
GR    68.0        2500    71.0    2600    85      2700

ET                  9.11    9.11    9.11                                    1300    2000
ET                                                  9.11                    1300    1950
X1    6870        19      1700    1820    760     710     870     0       0       0
GR    85          0       78.6    100     76.0    360     74.0    460     72.0    490
GR    70.0        500     66.0    700     64.0    1220    64.0    1530    63.0    1700
GR    56.0        1720    56.0    1765    62.0    1800    62.0    1820    64.0    1920
GR    65.5        2000    68.0    2200    91.0    2300    85      2700

ET                                                  9.11                    1540    2130
X1    8110        36      1900    2020    40      40      40      0       0       0
GR    85          0       78.0    130     78.0    160     78.0    220     76.2    400
GR    76.8        440     74.0    670     74.0    700     74.0    710     74.0    720
GR    74.0        730     74.0    1250    74.0    1270    74.0    1300    74.0    1350
GR    74.0        1400    72.0    1510    70.0    1520    64.0    1530    64.0    1570
GR    66.0        1580    78.0    1590    72.0    1660    74.0    1820    74.0    1830
GR    72.0        1840    70.0    1850    64.0    1860    63.0    1900    56.0    1920
GR    56.0        1960    62.0    2020    64.0    2300    72      2120    74      2300
1
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GR    85          2300

ET                  9.1     9.1     9.1     9.1                             1565    2355
ET                                                  9.11                    1540    2130
X1    8135        0       0       0       25      25      25      0       0       0

ET                  9.1     9.1     9.1     9.1                             1360    2040
ET                                                  9.11                    1400    1970
X1    8170        18      1700    1920    35      35      35      0       0       0
GR    85          0       78.6    100     76.0    360     74.0    460     72.0    490
GR    70.0        500     66.0    700     64.0    1220    64.0    1530    63.0    1700
GR    56.0        1720    56.0    1770    62.0    1800    64.0    1920    65.5    2000
GR    68.0        2280    71.0    2300    85      2700

ET                  9.1     9.1     9.1     9.1                             1680    2160
ET                                                  9.11                    1980    2160
X1    8735        27      2000    2115    565     565     565     0       0       0
GR    85          0       78.4    320     76.5    610     76.0    970     72.0    980
GR    70.0        990     64.0    1060    62.0    1700    63.1    1800    63.7    1900
GR    63.2        2000    55.0    2016    54.1    2016    53.9    2024    54.7    2038
GR    55.1        2054    57.5    2060    58.9    2085    61.9    2115    63.1    2139
GR    63.2        2236    68.2    2300    70.8    2480    76.0    2600    78.0    2700
GR    79.0        2950    85      3000

ET                  9.1     9.1     9.1     9.1                             1902    2212
ET                                                  9.11                    1910    2160
X1    8825        0       0       0       90      90      90      0       0       0

ET                  9.1     9.1     9.1     9.1                             1940    2210
ET                                                  9.11                    1940    2210
X1    8855        26      2058    2156    30      30      30      0       0       0
GR    85          0       78.4    320     76.5    610     76.0    970     72.0    980
GR    70.0        990     64.0    1060    62.0    1700    63.1    1800    63.7    1900
GR    63.2        2000    62.8    2058    54.5    2065    54.5    2075    55.1    2100
GR    55.7        2125    58.0    2138    64.4    2150    65.8    2156    66.3    2176
GR    66.9        2200    70.3    2300    72.8    2400    76.0    2600    78.0    2700
GR    85          2950

ET                                                  9.11                    1800    2083
X1    8870        38      1800    2083    15      15      15
X3    10                                                    78.9    78.0
GR    85          0       78      335     76      520     74      530     75      540
GR    70          570     70      870     63      1600    62.5    1799    76      1800
GR    66          1820    65      1825    62.6    1858    55.5    1865    54.6    1875
GR    55.9        1925    58      1930    65.8    1955    76      1973    66      1975
GR    61.5        1999    74.5    2000    74.5    2005    61.5    2025    60.5    2028
GR    59.5        2033    57.5    2034    57.5    2037    59.5    2038    61.5    2055
GR    62.5        2060    74.5    2078    76      2083    63      2100    67      2300
GR    73          2400    79      3000    85      3500
1
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NC    .05         .05     .040
ET                                                  9.11                    1800    2083
X1    8885        30      1800    2083    15      15      15
X3    4           1800    78.9    76      1973    78.9    76      2000    76      74.5
ET    2083        76      74.5
GR    85          0       79      100     78.9    1800    66      1820    65      1825
GR    67.6        1859    55.5    1865    54.6    1875    55.9    1925    58      1930
GR    65.8        1955    76      1973    76      2000    74.5    2005    74.5    2025
GR    61.5        2029    60.5    2028    59.5    2033    57.5    2034    57.5    2037
GR    59.5        2038    61.5    2055    62.5    2060    74.5    2078    74.5    2083
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GR    76          2083    78      2100    76      2300    78      2000    85      3500

ET                                                  9.11                    1800    2083
X1    8915        0                       30      30      30
X2                                                          1

NC    .1          .1      .040
ET                                                  9.11                    1800    2083
X1    8945        38      1800    2083    30      30      30
X3    10                                                    78.9    78.0
GR    85          0       78      375     76      520     74      530     75      540
GR    78          570     70      870     63      1600    62.5    1799    76      1800
GR    66          1820    65      1825    62.6    1858    55.5    1865    54.6    1875
GR    55.8        1925    58      1930    65.8    1955    76      1973    66      1975
GR    61.5        1999    74.5    2000    74.5    2005    61.5    2025    60.5    2028
GR    59.5        2033    57.5    2034    57.5    2037    59.5    2038    61.5    2055
GR    62.5        2060    74.5    2078    76      2083    63      2100    67      2300
GR    73          2400    79      3000    85      3500

ET                  9.1     9.1     9.1     9.1                             1962    2252
ET                                                  9.11                    1980    2238
X1    8950        29      2058    2171    5       5       5       0       0       0
GR    85          0       78.4    240     78.0    460     76.0    560     72.0    580
GR    70.0        670     68.0    910     66.0    990     64.0    1250    64.0    1600
GR    64.0        1720    64.0    1890    64.0    1920    64.3    1934    62.6    2000
GR    62.6        2058    55.5    2065    54.5    2075    55.7    2125    58.0    2130
GR    64.4        2150    65.7    2156    68.2    2171    68.9    2175    66.9    2200
GR    70.5        2300    72.8    2400    74.0    2500    85      2800

ET                  9.1     9.1     9.1     9.1                             1880    2300
ET                                                  9.11                    1880    2300
X1    9075        27      2092    2187    120     120     120
GR    90          0       78.4    240     78.0    460     76.0    560     72.0    580
GR    70.0        670     68.0    910     66.0    990     64.0    1250    64.0    1600
GR    64.2        2023    64.9    2065    61.8    2092    58.3    2100    55.8    2108
GR    55.4        2125    55.2    2155    57.7    2164    55.3    2165    55.6    2170
GR    62.7        2187    63.3    2300    67.5    2400    73.8    2412    74.0    2500
GR    76.0        2800    80      3000
1
     17JUL01     08:48:18                                                                                   PAGE    7

ET                  9.11    9.11    9.11                                    0900    2500
ET                                                  9.11                    0920    1920
X1    10360       33      1066    1198    1085    1285    1285    0       0       0
GR    80          0       76.0    35      74.0    40      72.0    45      70.0    50
GR    68.0        60      66.0    90      63.1    450     66.0    560     67.0    700
GR    68.0        820     67.0    876     70.0    920     65.8    991     65.4    1045
GR    65.8        1066    63.7    1093    61.8    1100    59.5    1105    57.5    1125
GR    56.8        1137    55.5    1158    55.4    1175    58.0    1184    64.9    1199
GR    65.9        1198    63.1    1200    64.9    1260    62.3    1400    64.8    1420
GR    66.0        2000    66.2    2100    80      2500

ET                  9.11    9.11    9.11                                    1600    4100
ET                                                  9.11                    1850    3620
X1    13400       40      3493    3590    3148    2940    2940    0       0       0
GR    80          0       78.9    230     76.0    420     74.0    440     72.0    450
GR    70.0        750     74.1    1058    75.2    1160    70.0    1310    66.3    1500
GR    66.0        1760    64.0    2000    66.0    2200    66.0    2266    70.0    2300
GR    68.0        2500    66.0    2640    66.0    2990    67.0    3276    65.3    3295
GR    64.1        3343    65.8    3391    65.4    3443    65.8    3466    63.7    3483
GR    61.6        3500    59.6    3505    57.5    3523    56.8    3527    55.5    3550
GR    55.5        3575    58.1    3583    64.9    3589    64.8    3600    74      3620
GR    74          3680    76      3980    78      4040    80      4080    74      4100

ET                  9.11    9.11    9.11    9.11                            1440    2700
ET                                                  9.11                    1600    2300
X1    15400       17      2175    2298    2008    1700    2000    0       0       0
GR    90          0       74.0    210     75      450     74      520     78      530
GR    69.7        1050    68.0    1110    66.0    1160    66.0    2175    62.0    2200
GR    57.0        2215    57.0    2285    66.0    2290    67.5    2358    66.5    2450
GR    75          2580    80      2700

ET                  9.11    9.11    9.11    9.11                            1998    2300
ET                                                  9.11                    1920    2240
X1    16435       23      1982    2080    1035    1035    1035
GR    90          0       79      100     79.5    500     80      700     80.5    1700
GR    66.9        1800    70.6    1920    69.9    1942    67.8    1982    67.4    1998
GR    59.1        2002    58.8    2010    57.5    2025    55      2040    55      2058
GR    56          2060    68.1    2080    67.5    2129    66.5    2250    65.5    2300
GR    70          3300    80      3700    90      4200

ET                                                  9.11                    2000    2173
X1    16725       29      2000    2173    270     270     270
X3    10
GR    90          0       79      100     79.5    500     80      700     80.5    1700
GR    80          1900    75      1950    68.7    1998    82      2000    68.7    2001
GR    66          2005    64      2042    58      2058    58      2075    59.4    2090
GR    58          2100    59.5    2115    64.1    2126    66      2125    66.8    2130
GR    69.5        2172    82      2173    69.5    2174    68      2200    72.5    2300
GR    67.2        2400    70      3300    80      3700    90      4200
1
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NC    .04         .04     .040
ET                                                  9.11                    2000    2173
X1    16725       36      2000    2173    20      20      20
X3    .2          2000    85.6    81.9    2087    85.7    82      2173    85.5    82
GR    100         0       80.6    100     60      350     79.5    400     80      700
GR    80.2        850     80      1900    78.1    1200    80      1300    80.9    1550
GR    82          1880    82.9    1800    84.9    1900    85.6    2000    68.7    2001
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GR      88      2005      84      2042      58      2050      58      2075      59.4      2087
GR      59      2100      58.5      2115      64.1      2120      66      2125      66.8      2158
GR      69.5      2172      65.5      2173      85.5      2200      85.5      2300      85.2      2400
GR      85      2600      84.5      3000      84.3      3200      84.5      3400      85      3700
GR      90      4200

ET                                                  9.11                                  2000      2173
X1    16755         0         0         0         30        30        30
X2                                                            1

ET                                                  9.11                                  2000      2200
X1    16770        29      2000      2200        15        15        15
X3       10
GR      100         0        79       100        78       400        79       850        78      1200
GR       79      1556      82.5      1800      83.5      1900        84      2000      88.7      2001
GR       88      2005        64      2042        58      2050        58      2075      59.4      2090
GR       59      2100      58.5      2115      84.1      2120        66      2125      66.8      2150
GR     69.5      2190        84      2200        84      2300      83.5      2600        93      3000
GR       83      3200        83      3400        84      3700        90      4200

ET                                                  9.11                                  2000      2200
X1    16785        43      2000      2238        15        15        15
BT        6      2000      65.6      81.8      2033      85.6      81.8      2033      85.6      81.8
BT     2205      85.6      81.3      2205      83.6      81.8      2238      85.6      81.8
GR      100         0      85.6       100        85       150      79.5       400        80       700
GR     88.3       850        80      1000      79.7      1200        80      1300      80.8      1550
GR       82      1598        84      1735      84.5      1800      85.5      1900      85.8      2000
GR     80.6      2001      80.6      2006      68.3      2025      67.2      2033        65      2050
GR     64.4      2066        60      2070      59.2      2075      58.1      2100      58.9      2120
GR     58.1      2125      58.1      2145      64.4      2150        62      2175      88.5      2205
GR     69.2      2215      88.5      2233      80.6      2237      85.6      2238      85.6      2300
GR     85.2      2400      84.8      2500      84.5      2600      84.4      3000      84.3      3200
GR     85.4      3400        85      3700        90      4200

ET                                                  9.11                                  2000      2200
X1    16815                                       30        30        30
X2                                                            1

ET                                                  9.11                                  2000      2200
X1    16845        19      2000      2200        30        30        30
X3       10
GR      100         0        79       100        78       400        79       850        78      1200
GR       79      1550      82.5      1800      83.5      1900        84      2000      88.7      2091
GR       66      2005        64      2042        58      2050        58      2075      59.4      2090
GR       59      2100      59.5      2115      84.1      2120        66      2125      66.8      2150
GR     69.5      2190        84      2200        84      2300      83.5      2600        93      3000
1
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GR       83      3200        83      3400        84      3700        90      4200

MC       .1         .1      .040
ET                  9.1       9.1       9.1       9.1                                   1924      2224
ET                                                  9.11                                  1924      2224
X1    16875        21      2000      2146        30        30        30
GR       90         2        78       100      78.5       500        80       700      78.1      1400
GR       78      1700      65.7      1780      65.1      1850        66      2000        60      2004
GR     56.5      2025        57      2048      61.4      2076      64.5      2118      64.6      2128
GR     69.2      2146      68.9      2285        71      2600      74.3      2618      74.5      4000
GR       90      4100

ET                  9.11      9.11      9.11                                            1840      3000
ET                                                  9.11                                  1660      2600
X1    19938        25      2000      2080      2570      2520      3025         0         0         0
GR       90         0        80       100        78       850        80      1100      80.6      1540
GR     78.8      1650      76.8      1670      74.6      1680      72.6      1778      66.6      1800
GR     73.8      1858      70.8      1918      68.8      1938      67.6      2000      57.5      2010
GR     57.5      2040      66.8      2080      56.5      2100      68.6      2150      68.9      2285
GR     68.8      2570      70.8      2680        77      4500        80      7000        90      7100

ET                  9.11      9.11      9.11                                            1920      3800
ET                                                  9.11                                  1930      3500
X1    22408        24      1978      2128      2550      2700      2900         0         0         0
GR       90         0        80       100      80.6       600        78       700        78      1920
GR     76.7      1955      76.8      1968      74.8      1970      72.6      1980      70.6      1985
GR     70.8      1998      68.8      2088      67.8      2028      62.6      2065      68.8      2090
GR     70.8      2128      68.8      2150      68.9      2285        70      2300        72      2700
GR       74      3600        78      5000        82      7000        95      7150

ET                  9.11      9.11      9.11                                            1700      4400
ET                                                  9.11                                  2600      4200
X1    25808        29      3483      3609      2850      2828      3000         0         0         0
GR       90       100        80       200        78      1000      78.8      1430      78.5      1656
GR     78.8      1728      76.8      2600      74.8      2200      70.6      2224      72.2      2366
GR     67.8      2467      72.2      2410      70.8      2434      71.1      2483      68.5      2500
GR     65.1      2503      63.1      2525      62.8      2550      62.6      2558      64.9      2597
GR     68.1      2592      71.6      2608      71.2      2657      66.5      2700      66.8      2800
GR     88.8      3818      70.8      4000        80      8829        90     10000

ET                  9.11      9.11      9.11                                            1100      4000
ET                                                  9.11                                  1440      2800
X1    28908        68      1500      1660      2950      2930      3100         0         0         0
GR     127.8         0     120.8       150     118.8       240     110.8       298     114.8       360
GR     112.8       420     110.8       460     108.8       498     106.8       520     104.8       540
GR     102.8       560     100.8       620      98.8       678      96.8       698      94.8       840
GR      92.8       940      90.8       980      88.8      1038      86.8      1110      86.8      1120
GR      86.8      1130      86.8      1150      85.8      1198      86.8      1200      86.8      1230
GR      86.8      1250      86.8      1280      86.8      1330      86.8      1380      84.8      1400
GR      80.8      1420      78.8      1430      76.8      1440      74.8      1450      72.8      1460
GR      70.8      1480      68.8      1500      65.5      1525      65.5      1573      70.8      1585
GR      72.5      1600      78.8      1660      80.8      1140      72.8      1760      74.8      1780
GR        82      6500        85      8700        90      8000
1
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ET                  9.11      9.11      9.11                                            0001      4000
ET                                                  9.11                                  0950      3300
X1    32400        24      1200      1300      3100      3000      3500         0         0         0
GR       90         0        88        30        86        80        84        90        82       105
GR       80       120        84       130        80       150        87       230        85       270
GR       78       400        78       480        78       640        74       860        72      1200
GR       66      1210        66      1270        73      1300        74      1500        75      1600
GR       75      2200        80      6000        85      9000        90      9100

ET                                                  9.11                                  1220      2400
X1    36600        24      1498      1589      4100      4100      4200         0         0         0
GR       90         0        84       400        84       850        82      1250        80      1350
GR     79.5      1427      75.2      1498      78.8      1500      81.5      1585      84.0      1525
GR     69.2      1560      72.0      1585      73.8      1599      74.8      1652      75.0      1760
GR     75.0      2000        80      2300        82      2600        82      3000        80      3100
GR       90      3600        82      3700        81      4000        81      4500

ET                                                  9.11                                  0500      2200
X1    38300        28      1500      1650      1700      1700      1700         0         0         0
GR       95         0      80.5       500      80.5      1000      78.0      1200      77.4      1300
GR     77.0      1347      77.0      1350      76.5      1427      76.0      1498      76.0      1500
GR     85.0      1515      65.0      1588      72.5      1615        82      1650        92      1700
GR       90      1900        78      2500      76.0      3000        85      4000        95      4500

ET                                                  9.11                                  1208      3200
X1    48100        28      2900      3035      1800      1800      1800         0         0         0
GR       95         0        85       500      76.2      2700      75.5      2762      74.8      2800
GR     76.4      2873      76.8      2900      70.0      2918      68.2      2925      68.8      2950
GR     67.7      2980      66.5      2995      72.8      3000      75.1      3023      81.3      3035
GR     82.8      3059      83.0      3074      81.1      3100        85      3700        85      4000

ET                                                  9.11                                  1400      3400
X1    41090        27      2415      2525       990       990       990
GR      100       550        95       580        90       620        85       650        84      1800
GR     83.3      2000      83.2      2390      75.1      2235      75.4      2365      76.9      2385
GR     74.4      2399      74.6      2415      70.9      2417      68.5      2445      68.0      2511
GR     74.6      2525      73.3      2528      72.8      2537      74.6      2551      73.3      2622
GR     72.3      2720      74.9      2761      81.6      2820        83      3500        84      5500
GR       85      7100      100       7400

ET                                                  9.11                                  1200      3200
X1    44420        25      1842      1840      1660      3000      3336
GR      105       400      100       500        95       550        90       600        85      0900
GR     82.5      1080      77.2      1136      78.5      1539      75.8      1704      78.2      1826
GR     77.1      1842      70.8      1844      71.5      1884      70.2      1914      77.1      1940
GR     76.7      2004      77.4      2184      77.1      2204      76.8      2304      77.2      2404
GR     78.9      2468      84.7      2504        85      7500        90      7600       100      7700
1
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ET                                                  9.11                                  1400      3400
X1    47720        28      2038      2150      3000      3000      3300
GR      105         0      100       100        95       150        90       200        86       400
GR     85.3      5600      83.4      1597      83.1      2038      71.3      2566      71.4      2183
GR     74.6      2140      78.3      2150      78.8      2700      77.6      2759      83.7      2800
GR     85.0      2900      84.9      4000        85      7250        90      7500       100      7600

QT        7      6750     13000     16700     28800     16700     16700      8730
ET                                                  9.11                                  3065      5585
X1    56220        25      3714      3836      7500      8500      8500
GR      110       800      105      1000       100      1100        95      1280        92      1560
GR     90.4      3000      94.1      3418      92.1      3519      84.6      3564      84.5      3646
GR     84.4      3660      85.0      3680      82.1      3690      81.2      3714      78.8      3718
GR     75.3      3758      77.7      3808      84.8      3839      84.2      4082      84.1      4600
GR       85      5000        86      6000        90      6300        95      7800       100      7700

MH        5      0.20      1650      0.10      2121      0.04      2207      0.10      2400      0.20
MH     6000
ET                                                  9.11                                  1950      2550
X1    59708        18      2121      2207      3100      2480      2480                .2
GR      110         0      105       500       100      1400        95      1650        90      1900
GR     88.4      1970      83.2      2061      84.6      2093      85.0      2121      79.6      2133
GR     74.2      2161      78.9      2205      86.4      2287      91.5      2600        95      2800
GR      100      3100      101      3500      110      6000

MH        5      0.20      1970      0.10      2121      0.04      2207      0.10      2360      0.20
MH     4000
ET                                                  9.11                                  1950      2300
X1    60430        22      2121      2267       730       730       730
GR      110         0      105       500       100      1000        95      1200        92      1300
GR     90.8      1760      88.4      1870      87.2      2067      84.6      2093      85.0      2121
GR     79.6      2133      74.2      2161      78.9      2205      86.4      2287      91.5      2219
GR     92.7      2360      93.2      2419      95.8      2460       100      2500       101      2600
GR      105      3000      110      4000

MC     0.10      0.10      0.04
ET                                                  9.11                                  2056      2272
X1    60685        22      2056      2272       255       255       255
X3       10                                                                          96.1      96.1
GR      110         0      105       500       100      1000        95      1100        92      1300
GR     90.8      1787      87.2      2056      81.2      2067      84.6      2093      85.0      2121
GR     79.6      2133      74.2      2161      78.9      2205      86.4      2287      91.5      2219
GR     92.8      2272      93.2      2419      95.8      2595       100      2700       101      3300
GR      105      3600      110      5200

RR     1.25       1.2       2.5         0        24         0      2676      1.92      74.0      74.0
ET                                                  9.11                                  2056      2272
X1    68715                                       30        30        30
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X2                          1     95.3     97.6
X3      10                                          98.0     98.5
ET      21      1000    101.1        0     1100     99.8        0     1200     98.6        0
ET      1200    99.1        0     1400     97.7        0     1500     97.1        0     1600
ET      97.7        0     1700     97.6        0     1800     97.6        0     1900     97.7
1
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ET      0       2000    97.5        0     2016     98.0     95.1     2272     99.0     95.1
ET      2300    99.0        0     2400     98.1        0     2500     98.6        0     2600
ET      98.9        0     2700     99.4        0     2800    100.5        0     2900    102.0
ET      0       3000    103.6        0
NH      5       0.30    1767     0.10     2121     0.04     2207     0.10     2593     0.30
NH      4000
ET                                           9.11                                 1900     2300
X1      60964       20     2121     2207      249      249      249
GR      110     500     105      700      100     1150       95     1300       92     1350
GR      90.8    1767    87.2     2067     84.6     2092     85.0     2121     79.6     2123
GR      74.2    2161    78.9     2205     86.4     2207     91.5     2219     93.2     2419
GR      95.8    2595    100      2700     101      3600     105      3800     110      4000

NH      4       0.30    1200     0.10     2121     0.04     2207     0.10     3500
ET                                           9.11                                 1800     2300
X1      61564       17     2121     2207      600      600      600
GR      110     0       105      600      100     1050       95     1200       90     1650
GR      87.2    2067    84.6     2093     85.0     2121     79.6     2123     74.2     2161
GR      78.9    2205    88.4     2207       90     2550       95     2750      100     2940
GR      105     3050    110      3500

MC      0.10    0.10    0.040
ET                                           9.11                                 1200     2700
X1      68410       21     1764     1949     6846     6846     6846
GR      110     700       94     1150     90.5     1400       88     1450       87     1500
GR      86.6    1550    86.5     1600     86.1     1620     86.1     1640     87.9     1660
GR      86.0    1746    83.3     1764     76.5     1770     76.0     1800     76.7     1842
GR      83.0    1849    86.2     1864     89.1     1900     93.9     2000    101.6     4000
GR      105     5000

ET                                           9.11                                 2200     3400
X1      62720       25     4263     4237    16000    12000    14310
GR      115       0      110      100      105      300      100      800       95     1100
GR      92.2    4000    92.5     4100     93.4     4101     89.0     4200     89.8     4263
GR      80.6    4268    80.4     4299     82.5     4327     87.6     4337     91.4     4413
GR      97.1    4433    96.9     4459     90.3     4503     90.1     4555     88.3     4767
GR      92.2    4853    93.1     4953       55     6100      100     6300      110     6500

ET                                           9.11                                 2200     6000
X1      92800       22     2768     2814     9100     8100    10080                 -0.6
GR      110     700     105      1500      100     1700       95     2000     92.1     2653
GR      89.1    2722    88.9     2769     85.4     2771     84.0     2786     85.2     2804
GR      92.1    2814    93.4     2820     89.0     2840     90.8     2858     95.0     2868
GR      96      3000      97     6000       98     8000      100     8150      105     8400
GR      110     8500      115    8550

ET                                           9.11                                 2500     8200
ET                                                                                2500     8200
X1      93600       26     2768     2810      800      800      800
GR      115     600     110      1000      105     1600      100     2000      100     2200
GR      102.8   2440    99.7     2540     98.0     2640     92.1     2655     89.1     2722
GR      88.9    2768    86.4     2771     84.0     2786     85.2     2804     91.5     2810
GR      93.4    2820    89.0     2840     90.0     2858     95.0     2868     96.4     3014
1
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GR      96.4    3000    98.4     3900      100     7500      105     7900      110     8150
GR      115.0   8200

MC      0.10    0.10    0.040
ET                                           9.11                                 2500     6200
ET                  9.11    9.11     9.11     9.11                                2500     8200
X1      93755       24     2703     2861      155      155      155
X3      10                                                    98.0     98.0
GR      115     500     110      700      105     1500      100     2000      100     2200
GR      100.8   2440    99.7     2540     98.0     2640     92.1     2655     89.8     2703
GR      89.7    2728    85.6     2738     84.5     2748     84.5     2858     86.2     2868
GR      92.1    2878    94.6     2881     95.3     2898     96.4     3034     96.4     3900
GR      100.0   8025    105.0    8100     110.0    8150     115.0    8200

SR      1.05    1.56    2.6      0        78.0     3        1940     4.5      84.5     84.5
ET                                           9.11                                 2500     6200
ET                  9.11    9.11     9.11     9.11                                2500     8200
X1      93795                                   30       30       30
X2                          1     98.3     97.7
X3      10                                                    100.0    98.2
ET      20      2000    100.0        0     2200     100.0        0     2440     100.0        0
ET      2540    99.7        0     2570     99.3        0     2600     99.5        0     2703
ET      99.4    98.1    2792     99.9     98.3     2800     99.9     98.3     2881     99.9
ET      98.3    2900    99.7        0     3000     98.5        0     3150     98.4        0
ET      3200    99.0        0     3300     97.7        0     3400     97.8        0     3800
RT      97.8        0     8025    105.0        0     8100    110.0        0     8150    115.0
RT      0

ET                                           9.11                                 2500     6200
ET                  9.11    9.11     9.11     9.11                                2500     8200
X1      93950       26     2768     2810      165      165      165
GR      115     600     110      1000      105     1600      100     2000      100     2200
GR      100.8   2440    99.7     2540     98.0     2640     92.1     2655     89.1     2722
GR      88.9    2768    86.4     2771     84.0     2786     85.2     2804     91.5     2810
GR      93.4    2820    89.0     2840     90.0     2858     95.0     2868     96.4     3014
GR      96.4    3500    98.4     3900      100     7500      105     7900      110     8150
GR      115.0   8200
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ET                                           9.11                                 2500     5100
ET                  9.11    9.11     9.11     9.11                                2500     8200
X1      94410       26     2768     2810      460      460      460
GR      115     600     110      1000      105     1600      100     2000      100     2200
GR      100.8   2440    99.7     2540     98.0     2640     92.1     2655     89.1     2722
GR      88.9    2768    86.4     2771     84.0     2786     85.2     2804     91.5     2810
GR      93.4    2820    89.0     2840     90.0     2858     95.0     2868     98.4     3034
GR      96.4    3500    98.4     3900      100     7500      105     7900      110     8150
GR      115.0   8200

MC      0.10    0.10    0.040
ET                                           9.11                                 2600     6300
1
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X1      110700      20     3902     3960     8000     9500    16290
GR      120     800     115      1100      110     1250      105     1500      101     2000
GR      102.5   5000      101     5750     99.1     5902     91.5     5912     91.0     5922
GR      90.8    5943    92.9     5956     95.6     5960     96.0     5970     96.7     5975
GR      100     6100      102     6700      105     7500      106     9050      107     9400

ET                                           9.11                                 4200     5600
X1      113850      23     4402     4548     2500     2000     3130
GR      130     400     125      800      120      800      115     1000      110     2000
GR      104.8   4000    104.3    4078     101.7    4096     99.5     4402     91.9     4414
GR      91.4    4452    91.2     4584     93.3     4538     96.0     4548     94.7     4578
GR      98.1    4580    97.3     4621     102.4    4641     101.1    4721     102.9    4821
GR      105     6000      110    6400       115    6500

ET                                           9.11                                 2100     2850
X1      118530      22     2698     2815     4680     4680     4680
GR      130     500     125      800      120      1000     115      1100     110      1600
GR      103.5   2000    104.8    2448     104.3    2592     105.0    2580     105.5    2670
GR      99.8    2688    94.8     2702     91.6     2722     88.5     2767     93.4     2807
GR      99.3    2815    111.1    2865     111.0    2965     108.7    3065     110      4050
GR      115     4500      130    4800

ET                                           9.11                                 1150     1458
X1      121500      16     1240     1363     2970     2970     2970
GR      111.5   1000    111.2    1028     107.8     1050     104.1    1154     97.5     1176
GR      99.2    1190    104.5    1230     100.0     1240     93.3     1265     90.6     1286
GR      91.0    1226    94.3     1352     103.0     1363     104.3    1420     101.3    1467
GR      121.5   1520

ET                                           9.11                                 1200     1508
X1      123380      17     1265     1379     2980     2980     2980
GR      130.0   690     125.0    880      120.0     1000     117.7    1114     114.0    1141
GR      110.7   1171    105.4    1191      96.4     1265     94.5     1263     93.9     1321
GR      94.8    1355    95.8     1379     100.4     1511     114.9    1586     120.0    1850
GR      125.0   2025    130.8    3525

ET                                           9.11                                 1200     1500
X1      123659      0        0        0        79       79       79
MC      0.12    0.12    0.016
ET                                           9.11                                 1222     1522
X1      123660      18     1231     1506        1        1        1
GR      117.0   1125    112.7    1161     110.2     1215     109.8    1237     107.8    1237
GR      107.4   1259    109.3    1259     106.6     1281     106.3    1447     108.3    1447
GR      107.2   1457    107.3    1506     108.8     1506     108.2    1543     108.5    1643
GR      109.3   1693    112.4    1703     117.2     1803

ET                                           9.11                                 1222     1522
X1      123661      0        0        0        1        1        1
1
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MC      0.12    0.12    0.055
ET                                           9.11                                 1222     1522
X1      123662      18     1209     1327        1        1        1
GR      110.0   957     118.1    1051     108.6     1157     107.1    1176     103.4    1209
GR      97.5    1247    95.7     1315     102.6     1327     102.3    1375     104.6    1433
GR      106.9   1467    109.1    1495     117.2     1515     119.2    1607     125.8    1700
GR      130.0   1800

ET                                           9.11                                 1222     1522
X1      123663      0        0        0        1        1        1
ET                                           9.11                                 1222     1522
X1      123664      0        0        0        2        2        2
ET                                           9.11                                 1200     1500
X1      123670      0        0        0        5        5        5
ET                                           9.11                                 1200     1500
X1      123680      0        0        0       10       10       10
ET                                           9.11                                 1190     1488
X1      123720      0        0        0       40       40       40
ET                                           9.11                                 1209     1435
X1      123770      31     1209     1435       50       50       50
X9      10                                                    112.0    112.0
GR      130.0   957     114.3    1126     111.9     1299     110.6    1219     109.3    1229
GR      106.6   1239    102.7    1245     100.2     1259     99.8     1269     99.1     1279
GR      98.6    1284    98.9     1299     97.6      1309     96.9     1319     98.0     1329
GR      99.9    1339    101.0    1349     101.9     1359     101.0    1369     102.4    1379
GR      101.3   1389    103.8    1399     105.0     1409     104.4    1419     104.4    1433
GR      106.9   1467    109.1    1485     117.2     1515     119.2    1607     125.8    1700
GR      130.0   1800
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SE    1.25     1.56     2.0      0      15.36     5.0     1671      9.1      98.5      98.5
ET                                                 9.11                       1209      1431
X1  123780                                           20       20
X2                          1    111.3    111.3                                                  113.8
X2      10                                                                                      113.8
RT      15       957     130.0      0      1000    125.3       0      1000     114.2         0
RT    1100     114.3        0     1200     113.3       0     1209     113.3     111.3      1300
RT   113.3     111.3     1322     113.4     111.3    1400     113.3     111.3     1403     113.4
RT   111.3     1560     113.5        0      1600    114.8       0      1700     118.0         0
RT    1700     125.9        0     1800     130.0       0
MC    0.12     0.12     0.055
ET                                                 9.11                       1160      1448
X1  123940       16      1289      1327       150      150       150
GR     130.8     957     114.1      1057     108.6     1157     107.1      1176     103.4      1209
GR      97.5     1247     95.7      1315     102.6     1327     102.3      1375     104.4      1433
GR     106.9     1467     108.1     1485     117.2     1575     119.2      1607     125.0      1700
GR     130.0     1800
1
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ET                                                 9.11                       0960      1208
X1  125600       15       930      1248      1660     1660      1860
GR      130      750      125       790       120      840       115       880      110       900
GR     101.2     930      99.5      968      96.7     1020       105      1040      110      1100
GR      112      1288      115      1380       120     1420       125      1560      130      1670
ET                                                 9.11                       0930      1260
X1  127500       17       960      1030      1900     1900      1900
GR      130      760      125       810       120      830       115       888      110       910
GR     101.2     968     102.3      968      98.0      990      98.2       998     98.4      1006
GR     102.4     1022     107.9     1530       110     1580       115      1550      120      1410
GR      125      1490      130      1570
ET                                                 9.11                       0975      1250
X1  128430       12      1082      1165       930      930       930
GR      130      900     107.4      1056     101.2     1092       102      1090      98.8      1110
GR     98.9      1125     99.1      1145     103.1     1170     100.6      1185     108.9      1211
GR     112.7     1323     116.9     1353     152.1     1322
ET                                                 9.11                       0860      1160
X1  130250       19       958      1026      1820     1820      1820
GR      130      790      125       820       120      840       115       870      110       940
GR     107.8     958     104.5      963      99.4      973      91.9       986     101.2      1022
GR     103.5     1020     104.2     1036       110     1088       115      1120      120      1130
GR      121      1170      123      1200       125     1830       130      1850
ET                                                 9.11                       0950      1250
X1  130560       17       1058      1136       310      310       310
GR      140      100       135       200       133      500       130       800      120       900
GR      126      900      107.6      1058     104.3     1061      99.2      1073     97.7      1086
GR      101      1122     103.3      1136     109.3     1196       110      1220      115      1300
GR      130      1600      130      1800
XT                                                 9.11                       0950      1500
X1  130860       20       1058      1136       300      300       300
GR      140      100       135       200       132      500       130       800      120       900
GR     120.0     900      107.6      1058     104.3     1063      99.2      1073     97.7      1086
GR     101.0     1122     103.3      1130     109.3     1136      109.0     1200     109.5     1300
GR     111.9     1400     112.1      1500     113.7     1600      115.9     1700     124.5     1742

QT       7       8350     12300     15800     27400     15800     15800     8400
NH       5       0.12     1700      0.12      1960      0.055     2030      0.12      2220      0.12
NH    2390
ET                 9.11     9.11      9.11      9.11                          9.11      700       2350
ET                                                 9.11                       1380      2080
X1  131760       19       1960      2030      8806      8600      8806
GR      132      150       124       170       120       270       110       450      109.1      1700
GR      109      1850      108       1960     102.8      1970     100.4      1975     97.9       1985
GR     100.4     2020      108       2030      109       2035      112       2150      116       2228
GR      117      2340      124       2380      122       2390
1
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NH       5       0.12     2700      0.12      2960      0.055     3030      0.12      3308      0.12
NH    5000
ET                 9.11     9.11      9.11      9.11                          9.11      1968      5608
ET                                                 9.11                       2380      3040
X1  132650       17       2960      3038       0500     0490      0490
GR      132      488       124       500       112       558       111       1200      110       1758
GR     109.5     2700      108       2960     102.7      2970     100.7      2975     98.2       2983
GR     100.7     3030      108       3038      112       3100       114      3138      120       3200
GR      124      3300      128       5000

NH       5       0.12     2500      0.12      2958      0.055     2900      0.12      3208      0.12
NH    6800
ET                 9.11     9.11      9.11      9.11                          9.11      2000      6800
ET                                                 9.11                       2400      4200
X1  134650       12       2800      2900      2338      1600      2900
GR     140.5     200      146.2      400       141.4     570       102       700       128       750
GR      124      820       120      1010      119.2     1058       116      1230      115       1500
GR     114.5     1908      114      2200       112      2500      109.5     2800     101.6      2810
GR     101.3     2820     100.2     2838      99.4      2840      98.7      2850      98.7      2863
GR      99.1     2870      99.7     2880      100.2     2890      107.3     2900      108.8     2980
GR      109      3200      104.5     4000      112       4200       114      4450      116       4560
GR      124      4900       126      6800

QT       3       6130     11400     15300     28400     15300     15300     5100
NH       4       0.12     6540      0.12      6580      0.055     8575      0.12      6640

ET                                                 9.11                       2800      6600
X1  144570       30       6500      6530      8000      9000      9928
GR      148       0        132       300       128       500       124       900       129      1080
GR      116      1040      116       2680      113       3100      116       3400      118      3500
GR     118.7     3700      118       3800      120       5000     120.9      5300     122.5     5600
GR      122      5700      120       5900     118.1      6340       114      6500      184.4     6505
GR     103.4     6510     103.4      6520     182.5      6530     181.6      6540     102.4     6550
GR     107.5     6580     103.9      6565       114      6570       126      6590     144.5     8840

NH       5       0.12     4750      0.12      4955      0.055     5015      0.12      5150      0.12
NH    5500
ET                                                 9.11                       1740      5040
X1  145260       28       4955      5015      0400      9800      0899
GR      132      488       117       800      118.5     1988       116      2150      116       2500
GR      118      2700      128       2900      122      3100      123.7     3400      124.3     3708
GR     124.3     3900      124.7     4300      124      4520       122      4558      120       4700
GR      116      4758     115.5      4920      115      4955      107.6     4960      104.7     4985
GR     107.6     5010      115       5015      113      5040       116      5090      120       5150
GR      124      5320      128       5440      132      5500

NH       5       0.12     3940      0.12      4337      0.055     4393      0.12      4520      0.12
NH    5100
ET                                                 9.11                       2800      4500
X1  145900       28       4337      4393      8600      0500      0640
GR      132      888       128       900       127      958       124       1000      120       1100
GR      119      1908      116       2100      116      2508      118       2700      122       2900
GR      124      3198      131       3440      128      3688      126       3868      124       3870
GR      120      3940      119       4260      116      4337      108.1     4348      105.5     4355
1
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GR      105      4365      106       4385     108.1     4390       116      4393      117       4460
GR      120      4520      124       5000      132      5100

NH       5       0.12     2900      0.12      2927      0.055     2983      0.12      3300      0.12
NH    5200
ET                                                 9.11                       1750      4150
X1  147210       22       2927      2983      0400      0488      1310
GR      122      1500      128       1600      124      1888       120      2138     119.3      2400
GR      118      2600      120       2870      118      2888       117      2927     109.5      2938
GR     107.1     2935     106.7      2945     107.6     2960      108.5     2980      117       2983
GR      117      3050     117.8      3300      119      3908       120      4350      124       4500
GR      128      4800      132       5200

MC     0.12     0.12     0.055
ET                                                 9.11                       2220      3600
X1  147940       25       2245      2345      0400      0488       0730                0.3
GR     141.8     305      128.4      720       127.1     975       125.5     1310     126.7      1555
GR     131.7     1985     123.2      2245      109.8     2260      109.1     2265     108.1      2285
GR     107.3     2295     107.8      2305      107.8     2315      108.7     2335     109.8      2345
GR     111.5     2360     113.8      2403      120.8     2478      122.6     2715     115.5      3305
GR     124.2     3835     118.1      4440      127.7     4665      141.2     4845     161.7      5085
ET                                                 9.11                       2245      3600
X1  148165        8        8         0        225       225       225                 -.5
X2       10                                                                    122.5     122.5
BR     1.05     1.5      2.5       0         69        2         1561      2.8       107.5     107.5
ET                                                 9.11                       2245      3600
X1  148195                                           30       30       30
X2                          1    122.8    125.8                                          125.5     125.5
BT      10                                                                     125.5     125.5
BT      18       200      130.2      0        400      129.7       0        625      127.5        0
BT    1010     126.3        0      1368     126.5        0      1760     126.8        0      2065
BT   126.1        0      2245     121.8     122.8     2403     125.8     122.8     2670     126.8
BT       0     2980     125.9        0      3170     129.8        0      3660     125.6        0
BT    3920     125.5        0      4320     127.8        0      4530     130.5        0      4780
BT   140.4        0      5075     152.8        0

ET                                                 9.11                       2220      3720
X1  148340       20       2245      2345       145       145       145
GR     121.7     1985     123.2      2245      109.8     2260      109.1     2265     108.1      2285
GR     107.3     2295     107.8      2305      107.8     2315      108.7     2335     109.8      2345
GR     111.5     2360     113.8      2403      120.8     2478      122.6     2715     115.5      3305
GR     124.2     3835     118.1      4440      127.7     4665      141.2     4845     161.7      5085

ET                                                 9.11                       1150      1750
X1  169220       25       1320      1390      11880     11880     11880
GR     141.2     200      143.3      360       152.8     328       164.5     340      144.2      920
GR     129.0     1140     119.8      1298      116.3     1310      115.7     1320     114.8      1330
GR     123.9     1350     113.7      1360      114.8     1378      115.1     1380     115.8      1390
GR     116.3     1400     118.5      1425      128.8     1588      129.8     1700     131.8      1890
GR      134      2230       140      2700      150.5     2868      161.3     3078      162       3218
1
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ET                                                 9.11                       1685      2685
X1  165810       26       2618      2658      5588      5598      5598                -1.0
GR     157.4     275      145.1      525       137.5     785       132.8     1125     133.5      1525
GR     136.1     1675     131.2      1865      133.5     2075      129.3     2315     127.3      2455
GR     124.8     2518     123.5      2585      119.7     2665      119.7     2618     116.7      2615
GR     115.7     2625     116.2      2633      116.9     2645      119.2     2658     119.7      2655
GR     124.8     2685     142.2      2845      155.1     3125      163.1     3145     169.8      3545
GR     175.5     3758

MC     0.12     0.12     0.055
ET                                                 9.11                       1700      2691
X1  166035       28       2681      2691       225       225       225                 1.0
X2       10                                                                    126.0     126.0
GR     157.4     275      145.1      525       137.5     785       132.8     1125     133.5      1525
GR     136.1     1675     131.2      1865      133.5     2075      129.3     2315     127.3      2455
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GR   127.3     2401     124.8     2510     124.0     2535     119.7     2685     119.2     2610
GR   116.7     2615     115.7     2675     116.2     2695     118.9     2645     119.2     2690
GR   119.7     2655     124.0     2605     120.6     2691     142.2     2945     155.1     3125
GA   163.7     3345     169.8     3545     175.5     3750

SE    1.25      1.5      2.5        0       12       9.5     2377     8.94     114.5     114.5
ET                                          9.11                                1700      2695
X1  166065                                    30       30       30                .1
X2                                 1     133.5     136.5
X3       10                                                          136.0     136.0
BT       13      200     155.0        0      555     143.5        0      880     138.1        0
BT     1150     137.5        0     1380     138.2        0     1620     118.3        0     2060
BT   138.4        0     2310     137.5        0     2481     136.5     133.5     2695     136.5
BT   133.5     2855     139.1        0     3140     149.7        0     3330     161.3        0
BT     3930     170.6        0     3830     161.9        0     3950     164.2        0     4240
BT   166.5        0

ET                                          9.11                                1750      2685
X1  166265       20     2610     2650      200      200      200
GR   157.4      275     145.1      525     137.5      785     132.8     1125     133.5     1525
GR   126.1     1675     131.2     1865     133.5     2075     129.3     2315     121.3     2455
GR   124.8     2510     123.5     2585     119.7     2605     119.2     2610     116.7     2655
GR   115.7     2625     116.2     2635     116.9     2645     119.2     2650     119.7     2655
GA   124.0     2685     142.2     2845     155.1     3125     163.7     3345     169.8     3545
GR   175.5     3750

ET                                          9.11                                0800      1200
X1  169000       25      977     1025     2735     2735     2735
GR     152      680      184      720      140      730      136      760      132      780
GR     124      818      124      920     122.9      955     121.9      977     118.4      985
GR   117.4     1000     118.4     1015     121.9     1025     123.9     1052      124     1060
GR     128     1130      132     1200      126     1300      128     1400      140     1470
GR   144.4     1750      141     2850     146.7     2300     154.3     2500     157.8     2700
1
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ET                                          9.11                                0780      1780
X1  170540       25      805      853     1540     1540     1540
GR   101.0      200     102.4      330     100.1      470     102.9      665     124.0      790
GR   121.8      905     120.5      810     118.3      930     119.0      840     126.3      850
GR   121.8      855     123.5      870     129.8     1160     127.5     1350     133.0     1550
GR   138.8     1790     136.6     1850     139.5     2195     140.4     2540     142.3     2720
GA   141.0     2845     146.7     3100     154.3     3285     157.8     3495     156.4     3740

ET                                          9.11                                 565      1665
X1  174050       24     1775     1840     3610     3510     3510
GR   128.8      200     126.0      455     126.8      695     127.1      875     124.4     1238
GR   132.0     1420     132.1     1600     124.0     1745     123.4     1775     122.9     1780
GR   120.8     1800     120.4     1810     120.8     1820     121.9     1830     122.9     1835
GR   123.4     1440     124.8     1855     153.7     1970     153.6     2220     151.7     2410
GR   155.1     2570     168.7     2780     185.4     3030     193.4     3270

ET                                          9.11                                1530      2030
X1  176130       25     1615     1675     2080     2080     2080
GR   174.6      200     168.8      395     158.2      650     157.8      850     157.7     1060
GR   155.3     1260     152.6     1390     128.6     1570     124.2     1615     123.7     1620
GR   121.9     1640     120.8     1650     121.0     1660     122.3     1670     123.9     1675
GR   124.3     1685     128.0     1740     134.1     1930     139.5     2090     142.5     2350
GR   141.0     2490     139.8     2660     139.0     2860     147.7     3120     149.0     3330

ET                                          9.11                                0850      1450
X1  177470       19     1355     1415     1340     1340     1340
GR   158.3      765     157.1      915     129.5      725     129.8      985     129.9     1095
GR   129.5     1215     127.8     1335     125.1     1355     123.6     1365     120.9     1375
GR   119.1     1385     120.0     1395     121.1     1405     125.1     1415     128.0     1435
GR   146.1     1575     148.9     1770     152.7     2045     154.0     2245

ET                                          9.11                                0850      1454
X1  177705       21     1256     1454     9235     9235     9235                -.2
X3       10                                                          141.3     143.0
GR   158.3      365     153.1      555     129.5      725     141.0      885     129.9     1095
GR   129.5     1215     129.2     1256     128.0     1325     125.1     1355     123.6     1365
GR   120.9     1375     119.1     1385     120.0     1395     121.1     1405     125.1     1415
GR   128.0     1435     130.7     1454     146.1     1575     148.9     1770     152.7     2045
GR   154.0     2245

SE    1.25      1.5      2.5        0       74       4.5     2872     3.06     119.5     119.5
ET                                          9.11                                0850      1454
X1  177735                                    30       30       30
X2                                 1     140.8     141.0
X3       10                                                          141.5     145.1
BT       12      200     145.8        0      605     141.5        0      800     141.8        0
BT     1050     142.8        0     1256     144.6     140.8     1275     144.6     140.8     1380
BT   144.6     140.8     1454     144.6     140.8     1610     144.6        0     1820     145.1
BT        0     2085     146.4        0     2420     148.8        0
1
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NH        5     0.30     1095     0.12     1355     8.855     1415     0.12     1575     0.30
NH     2245
ET                                          9.11                                0850      1500
X1  177812       19     1355     1415      177      177      177                 0.2
GR   158.3      365     153.1      515     129.5      725     141.0      885     129.9     1095
GR   129.5     1215     127.8     1335     125.1     1355     123.6     1365     120.9     1375
GR   119.1     1385     120.0     1395     121.1     1405     125.1     1415     128.0     1435
GR   146.1     1575     148.9     1770     152.7     2045     154.0     2245

NC     6.52     0.12     8.955
ET                                          9.11                                0695      2480
X1  180150       22      715      765     1708     1900     2838
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GR   131.0      200     181.5      370     183.1      555     128.0      695     126.2      715
GR   125.2      720     122.7      730     121.8      740     121.1      750     125.8      760
GR   126.2      765     128.8      810     129.0      910     129.5     1115     130.1     1410
GR   129.0     1660     130.7     1860     132.9     2130     132.8     2290     136.2     2570
GR   135.1     2760     146.4     3020     152.5     3160

ET                                          9.11                                1560      1860
X1  183479       18     2904     3030     2729     2729     2729
GR     156      880      140     1100      139     1300      137     2400     136.5     2904
GR   126.5     2965     125.5     2970     123.0     2980     121.3     2990     123.6     3000
GR   125.3     3010     126.5     3015      130     3030      132     3040      140     3120
GR     142     3150      144     3300      148     3500

ET                                          9.11                                1560      3120
X1  183529        0        0        0       50       50       50
ET                                          9.11                                1560      3120
X1  183530       12     2904     3065        1        1        1
GR     156      800      140     1100      139     1300      137     2400     136.5     2904
GR   130.3     2995     130.5     3094     132.8     3085      140     3120      142     3150
GR     144     3300      148     3500

ET                                          9.11                                1560      3120
X1  183532        0        0        0        2        2        2
ET                                          9.11                                1560      3120
X1  183533       18     2904     3030        1        1        1
GR     156      880      140     1100      139     1300      137     2400     136.5     2904
GR   126.5     2965     125.5     2970     123.0     2980     121.3     2990     123.6     3000
GR   125.3     3010     126.5     3015      130     3030      132     3040      140     3120
GR     142     3150      144     3300      148     3500

ET                                          9.11                                1560      3120
X1  183534        0        0        0        1        1        1
ET                                          9.11                                1560      3120
X1  183535        0        0        0        1        1        1
1
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ET                                          9.11                                1560      3120
X1  183537        0        0        0        2        2        2
ET                                          9.11                                1560      3120
X1  183540        0        0        0        3        3        3
ET                                          9.11                                1560      3120
X1  183545        0        0        0        5        5        5
ET                                          9.11                                1560      3120
X1  183555        0        0        0       10       10       10
ET                                          9.11                                1560      3120
X1  183575        0        0        0       20       20       20
ET                                          9.11                                1560      3120
X1  183850        0        0        0     0215     0215     0215
ET             9.11     9.11     9.11     9.11                      9.11      1600      2600
ET                                          9.11                                1750      2300
X1  184810       18     2150     2255     0960     0960     0960
GR   146.0        0    144.0      170    142.0      490    140.0      555     138.0      765
GR   136.0      860    136.0     1750    134.0     1860    132.0     1985     128.0     2150
GR   122.3     2170    122.5     2230    126.0     2255    132.8     2300     134.0     2360
GR   148.0     2480

ET             9.11     9.11     9.11     9.11                      9.11      1850      2350
ET                                          9.11                                1875      2125
X1  185105        0        0        0     0295     0295     0295                 1.5
ET                                          9.11                                1775      2811
X1  185255       19     1775     2011      150      150      150                 1.6
X3       10                                                                    149.0
GR   146.0        0    144.0       85    142.0      180    140.0      245     138.0      455
GR   136.0      500    136.0     1440    124.0     1550    132.0     1675     128.6     1775
GR   128.0     1840    122.3     1868    122.5     1928    128.0     1945     132.0     1998
GR   132.7     2011    134.8     2058    148.8     2178    158.0     2488

SE    1.25      1.5      2.6        0       84       5.5     4186     3.78     124.0     124.0
ET                                          9.11                                1775      2811
X1  185345                                    90       90       90                 .2
X2                                 1     148.5     151.4
X3       10                                                                    151.9     152.5
BT       17      470     154.4        0      740     151.7        0      960     151.4        0
BT     1190     151.7        0     1420     151.9        0     1510     152.0        0     1680
BT   152.0        0     1775     152.8     149.5     1900     152.0     148.5     2011     152.8
BT   148.5     2160     152.0        0     2350     152.1        0     2550     152.9        0
BT     2850     154.5        0     3030     156.5        0     3240     157.5        0     3500
BT   158.7        0
1
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ET             9.11     9.11     9.11     9.11                      9.11      1850      2350
ET                                          9.11                                1900      2200
X1  180493       16     2150     2255      150      150      150
GR   146.0        0    144.0      170    142.0      490    140.0      555     138.0      765
GA   136.0      860    138.0     1750    134.0     1860    132.0     1985     128.0     2150
GR   122.3     2170    122.5     2230    126.0     2255    132.0     2300     134.0     2360
GR   148.0     2480
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ET                  9.11      9.11      9.11      9.11                          9.11      1300      2350
ET                                                          9.11                          1480      2430
X1   185770          28      1940      2085      2275      2275
GR    147.0       885.      146.4      1105      142.3      1295      136.6      1475      130.5      1675
GR    128.6      1750.      129.0      1940      125.5      1955      125.9      1985      126.6      2015
GR    127.7      2075.      124.6      2095      122.0      2125      123.1      2185      125.1      2455
GR    142.2      2695.      160.2      2850      171.8      3045

ET                                                          9.11                          1100      2100
X1   183630          27      1500      1580      1860      1860      1860
GR    163.0       200.      153.5       270      158.0       410      161.8       660      163.5       760
GR    162.3       830.      160.8      1000      151.6      1050      151.8      1110      152.8      1190
GR    130.4      1410.      129.5      1500      127.5      1510      126.5      1520      125.5      1530
GR    124.6      1540.      125.4      1550      126.2      1560      127.5      1570      129.5      1580
GR    130.0      1610.      134.2      1810      141.4      2170      146.6      2420      149.5      2700
GR    159.8      2920.      162.9      3100

NH        4         .5      1310       .12      2300       .055      2080       .12      2690
ET                                                          9.11                          1320      2120
X1   186770          20      2000      2080      1140      1140      1140
GR     154.       700.       141.       760.       140.      1130.       136.      1170.       132.      1230.
GR     132.      1440.      132.9      1690.       132.      1870.       130.      2000.       125.      2010.
GR    123.5      2040.       125.      2070.       130.      2080.       132.      2220.       136.      2530.
GR     140.      2570.       146.      2600.       148.      2610.       152.      2630.       156.      2690.

NH        5         .6      1800       .12      3000       .055      2070       .12      2370         .6
NH     2580
ET                                                          9.11                          1900      2400
X1   189300          15      2000      2070      0700      1000      0930
GR     152.      1140.       140.      1180.       136.      1218.       132.      1310.       132.      1800.
GR     132.      1890.       130.      2000.       125.      2010.      122.1      2035.       125.      2060.
GR     130.      2010.       132.      2120.       132.      2370.       136.      2400.       156.      2500.

NH        3         .7      2380       .12      2460       .055      2520       .12      2580         .7
NH     4605
ET                  9.11      9.11      9.11      9.11                  9.11                2380      2600
ET                                                          9.11                          2390      2590
X1   190174          36      2468      2520       474       474       474                   -1.9
GR    174.5       120.      172.2       290.      171.9       490.      168.5       675.      164.1       860.
GR     156.       985.       140.      1160.      132.5      1280.      132.5      2100.      132.5      2270.
GR    133.5      2386.      132.6      2403.      130.4      2460.      129.4      2465.      127.9      2470.
GR    126.6      2480.      125.9      2490.      126.0      2497.      126.8      2500.      127.9      2510.
GR    128.9      2515.      130.4      2520.      132.5      2540.      132.5      2580.      130.4      2630.
GR    130.4      2655.      133.0      2720.      133.0      2800.      133.8      3010.      141.1      3210.
GR    141.8      3370.      150.2      3710.      159.8      3970.      163.8      4190.      168.8      4350.
1
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GR    173.7      4605.

NH        3         .7      2380       .12      2460       .055      2520       .12      2540         .7
NH     4605
ET                  9.11      9.11      9.11      9.11                  9.11                2420      2560
ET                                                          9.11                          2430      2550
X1   190364           0         0         0       190       190       190
                                                                                            2480      2497
ET                                                          9.11
X1   190464          24      2403      2497       100       100       100                   -3.8
X3       10                                                                     146.5       146.5
GR    174.5       120.      172.2       290.      171.9       490.      168.5       675.      164.1       860.
GR     156.       985.       140.      1160.      132.5      1280.      132.5      2270.      132.5      2380.
GR    132.6      2403.      130.4      2460.      129.4      2465.      127.9      2470.      126.6      2480.
GR    125.9      2490.      126.8      2497.      126.8      2500.      127.8      2510.      128.9      2515.
GR    130.4      2520.      132.5      2540.      132.5      2615.      130.4      2630.      130.4      2655.
GR    133.0      2720.      133.8      3010.      141.1      3210.      141.8      3370.      150.2      3710.
GR    159.8      3970.      163.8      4190.      168.8      4350.      173.7      4605.

ZB        1         1.5       2.5         0         74         .1      1901         .78      122.0      122.0
ET                                                          9.11                          2403      2497
X1   190496                                          32        32        32
X2                                    1      144.4     147.2
X3       10                                                                     148.0       148.5
BT       16       200.      153.2         0       740       151.6         0      1335       147.7         0
BT     1820      147.2         0      2403      147.6       144.4      2450       147.6       144.4      2497
BT    147.6      144.4      2690       148.8         0      2950       150.0         0      3290       151.8
BT        0      3500       152.6         0      3750       154.6         0      4045       156.8         0
BT     4485      168.2         0      4830      162.7         0      5050       163.2         0

NH        5         .9      2380       .12      2403       .055      2520       .12      2540         .9
NH     4605
ET                                                          9.11                          2403      2520
X1   190550          34      2403      2520        54        54        54                   -2.0
X3       10                                                                     148       148
GR    174.5       120.      172.2       290.      171.9       490.      168.5       675.      164.1       860.
GR     156.       985.       140.      1160.      132.5      1280.      132.5      2270.      132.5      2380.
GR    132.6      2403.      130.4      2460.      129.4      2465.      127.9      2470.      126.6      2480.
GR    125.9      2490.      126.8      2497.      126.8      2500.      127.9      2510.      128.9      2515.
GR    130.4      2520.      132.5      2540.      132.5      2615.      130.4      2630.      130.4      2655.
GR    133.0      2720.      133.8      3010.      141.1      3210.      141.8      3370.      150.2      3710.
GR    159.8      3970.      163.8      4190.      168.8      4350.      173.7      4605.

ET                                                          9.11                          2337      2504
X1   190806          36      3337      2504        54        54        54                   -1.0
X3       10                                                                     147.2       147.4
GR    174.5        88.      172.2       250.      171.9       450.      168.5       635.      164.1       820.
GR     156.0       941.       148.      1128.      132.5      1240.      132.5      1992.      132.5      2058.
GR    132.5      2152.      132.5      2159.      132.5      2230.      133.5      2237.      130.4      2270.
GR    129.4      2425.      127.9      2430.      126.6      2440.      125.9      2450.      126.8      2460.
GR    127.9      2470.      128.9      2475.      130.4      2480.      132.5      2584.      132.5      2595.
GR    130.4      2630.      130.4      2815.      133.0      2880.      133.8      2970.      141.1      3170.
GR    141.8      3210.      150.2      3670.      159.8      3930.      163.8      4150.      168.8      4330.
1
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ZB    1.25       1.5       2.5         0         69         6.7      2849       1.96      125.0      125.0
ET                                                          9.11                          2337      2504
X1   190836                                          32        32
X2                                    1      158.2     147.5
X3       10                                                                     148.0       148.4
BT       20       230      158.3         0       480       154.3         0       915       147.9         0
BT     1240      147.8         0      1560      147.5         0      1690       148.0         0      2010
BT    150.1         0      2270       153.0         0      2337       153.8       150.3      2450       153.8
BT    150.3      2504       153.8       150.3      2625       153.1         0      2910       148.0         0
BT     3145      147.9         0      3880       151.8         0      3925       151.9         0      4190
BT    156.3         0      4470       164.5         0      4700       169.5         0      4985       174.2
BT        0

NH        5         .7      2685       .12      2765       .055      2825       .12      2920         .7
NH     4910
ET                  9.11      9.11      9.11                                                2513      3047
ET                                                          9.11                          2600      2670
X1   190920          36      2765      2825       164       164       164                   -0.7
GR    174.5       425.       172.2       595       171.9       795       168.5       980       164.1      1165
GR     156.0      1290       140.0      1465       132.5      1585       132.5      2337       132.5      2403
GR    132.5      2497       132.5      2504       132.5      2573       132.5      2685       132.5      2765
GR    129.4      2770       127.9      2775       126.6      2785       125.9      2795       126.8      2805
GR    127.9      2815       128.9      2820       130.4      2825       132.5      2845       132.5      2920
GR    130.4      2935       130.4      2960       133.0      3025       133.8      3315       141.1      3515
GR    141.8      3675       150.2      4015       159.8      4275       163.8      4495       168.8      4655
GR    173.7      4910

NH        5         .6      2575       .12      2765       .055      2825       .12      3025         .5
NH     4910
ET                  9.11      9.11      9.11                                                2400      3100
ET                                                          9.11                          2450      3058
X1   188920          36      2765      2825       100       100       100
GR    174.5       425.       172.2       595       171.9       795       168.5       980       164.1      1165
GR     156.0      1290       140.0      1465       132.5      1585       132.5      2337       132.5      2403
GR    132.5      2497       132.5      2504       132.5      2573       132.5      2685       132.5      2765
GR    129.4      2770       127.9      2775       126.6      2785       125.9      2795       126.8      2805
GR    127.9      2815       128.9      2820       130.4      2825       132.5      2845       132.5      2920
GR    130.4      2935       130.4      2960       133.0      3025       133.8      3315       141.1      3515
GR    141.8      3675       150.2      4015       159.8      4275       163.8      4495       168.8      4655
GR    173.7      4910

ET                  9.11      9.11      9.11                                                2100      3500
ET                                                          9.11                          2090      3400
MC       0.12       0.12      0.055
X1   191500           0         0         0       580       580       580                    0.2
QT        7       5620      11000      14300      25300      14300      14300      5080
ET                                                          9.11                          3800      3200
X1   193840          28      3128      3180      3800      2340      2340
GR    149.8       208.       142.8       525       144.8       695       142.6       820       144.4       935
GR    142.7      1198       140.1      1275       142.5      1420       142.3      1590       141.8      1765
GR    140.2      1978       138.2      2200       135.4      2485       133.8      2770       133.1      3095
GR    131.3      3128       129.9      3125       128.2      3156       126.4      3140       126.3      3150
1
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GR    128.4      3160       129.5      3165       131.3      3170       140.0      3180       160.0      3275
GR    172.2      3305       174.5      3475       175.1      3640

ET                                                          9.11                          1550      2900
X1   195378          27      2680      2730      1528      1528      1528
GR    149.3       150.       150.0       380       146.1       750       142.3       800       144.7      1070
GR    142.5      1290       143.5      1540       142.8      1880       139.5      2240       136.8      2395
GR    133.5      2580       132.0      2650       131.9      2680       130.3      2685       128.4      2690
GR    127.7      2700       126.9      2710       128.8      2720       129.8      2725       131.9      2730
GR    132.0      2760       133.5      2810       146.5      3050       152.0      3250       155.2      3470
GR    160.7      3620       161.2      3760

MC       0.12       0.12      0.055
ET                                                          9.11                          1500      2770
X1   195504          29      2631      2779       126       126       126                    -.6
X3       10                                                                     143.5       148.0
GR    149.3       150.       150.0       380       146.1       750       142.3       800       144.7      1070
GR    142.5      1290       143.5      1540       142.8      1880       139.5      2240       136.8      2395
GR    133.5      2580       132.4      2631       132.0      2650       131.9      2680       130.3      2685
GR    128.4      2690       127.7      2700       126.9      2710       128.0      2720       129.9      2725
GR    131.9      2730       132.0      2760       132.6      2779       133.5      2810       146.5      3050
GR    152.0      3250       155.2      3430       160.7      3620       161.2      3760

ZB    1.25       1.5       2.5         0         31         3.1      1712       3.84      126.5      126.5
ET                                                          9.11                          1500      2779
X1   195536                                          32        32        32                    .1
X2                                    1      144.9     143.7
X3       10                                                                     144.2       148.4
BT       16       200      147.8         0       535       145.5         0       850       145.2         0
BT     1100      144.0         0      1330      143.7         0      1620       141.8         0      1970
BT    145.1         0      2320       146.0         0      2631       147.8       144.9      2705       141.9
BT    144.9      2779       147.9       144.9      2960       149.2         0      3250       155.0         0
BT     3400      158.2         0      3690       162.0         0      3840       166.2         0

ET                                                          9.11                          1360      2900
X1   195770          27      2680      2730       234       234       234
GR    149.3       150.       150.0       380       146.1       550       142.3       850       144.7      1070
GR    142.5      1290       143.5      1540       142.8      1880       139.5      2240       136.8      2395
GR    133.5      2580       132.0      2650       131.9      2680       130.3      2685       128.4      2690
GR    127.7      2700       126.9      2710       128.0      2720       129.9      2725       131.9      2730
GR    132.0      2760       133.5      2810       146.5      3050       152.0      3250       155.2      3470
GR    160.7      3620       161.2      3760
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MC    0.12    0.12    0.055
ET                                                  9.11                                    1550      2900
X1  199970      21    2380    2420    3500    4200    4200
GR     147.8     200     159.2     620     145.5     970     141.8    1450     146.6     1970
GR     135.6    2345     131.8    2365     131.3    2365     129.6    2370     128.8     2380
GR     128.2    2290     129.3    2400     129.9    2410     131.3    2415     133.0     2420
GR     134.0    2470     134.5    3520     128.0    2820     143.2    2910     159.5     3140
GR     154.2    3270     155.0    3450     161.8    3710
1
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ET                                                  9.11                                     800      3200
X1  209660      25    1970    2030    4000    2000    9690
GR     156     410     152     550     140     640     144     700     140     720
GR     140    1600     148.5    1800     140    1880     138    1920     135    1970
GR     132.5    1975     131.8    1980     130.5    1990     130.0    2005     131.0     2010
GR     132.5    2020     133.0    2025     135    2030     139     2080     139.5     2600
GR     140    3500     144    3650     148    3730     152    3750     156    4350

ET                                                  9.11                                    1100      3150
X1  218600      23    1870    2020    0940    0940    0940                    1.2
GR     156     300     152     1050     144     1130     140     1170     142     1540
GR     143.5    1750     142     1900     140     1960     135.1     1970     132.8     1975
GR     131.7    1980     130.6     1990     130.1     2000     131.1     2010     132.8     3020
GR     133.1    3025     135.1     2030     144     2070     146     2150     146.2     2320
GR     148    3100     152    3120     156    3200

ET                                                  9.11                                    1600      2500
X1  211350      21    2210    2265     750     750     750
GR     155.7     1000     152     1380     148     1470     146     1550     145     1800
GR     144.4     2000     144.2     2140     139     2210     133.5     2220     131.8     2226
GR     130.6     2229     131.8     2240     132.0     2245     133.5     2254     139.6     2265
GR     144     2300     146     2400     148     2750     152     2960     156     3220
GR     160     3500

ET                                                  9.11                                    0950      1550
X1  211500      20    1405    1470     150     150     150
GR     161.3     350     160.8     590     150.5     750     145.1     1040     144.8     1258
GR     142.5    1380     136.1     1405     134.1     1410     132.4     1420     131.8     1430
GR     130.7    1440     131.1     1450     132.1     1460     133.6     1465     136.1     1470
GR     141.5    1480     151.3     1560     155.8     1700     155.8     1920     157.2     2190

NC    0.12    0.12    0.055
ET                                                  9.11                                    1000      1550
X1  211626      22    1375    1534     126     126     126
X2     10                                                                   149.3     149.3
GW     161.3     397     160.8     637     150.5     797     145.1     1287     144.8     1297
GR     142.0    1315     140.0     1432     136.1     1452     134.1     1457     132.4     1467
GR     131.8    1477     130.7     1487     131.1     1497     132.1     1507     133.6     1512
GR     136.1    1517     139.4     1534     140.9     1537     151.5     1627     155.8     1747
GR     155.8    1967     157.2     2237

SB    1.25     1.5     2.5       0      82     4.6    1600     .45     131.5     131.5
ET                                                  9.11                                    1050      1550
X1  211654                                      28      28      28
X2                              1     147.8     150.0
X3     10                                                                   150.5     153.0
BT     12     200     161.9       0     540     154.8       0     770     153.4       0
BT   1005     150.0       0    1230     151.1       0    1375     150.8     147.8    1435
BT    150.8     147.8    1534     150.8     149.8    1590     151.0       0    1900     152.9
BT      0    2170     156.1       0    2380     157.1       0
1
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ET                                                  9.11                                    1050      1550
X1  211880      20    1405    1470     226     226     226
GW     161.3     350     160.8     590     150.5     750     145.1     1040     144.8     1258
GR     142.5    1380     136.1     1405     134.1     1410     132.4     1420     131.8     1430
GR     130.7    1440     131.1     1450     132.1     1460     133.6     1465     136.1     1470
GR     141.5    1480     151.3     1560     155.8     1700     155.8     1920     157.2     2190

NC    0.12    0.12    0.055
ET                                                  9.11                                    1040      1940
X1  214360      27    1140    1240    2480    2480    2480
GR     168.2     200     165.0     350     163.0     550     158.7     710     151.1     955
GW     138.0    1119     137.2     1140     133.9     1145     133.3     1150     132.7     1160
GR     132.4    1170     132.3     1180     132.0     1190     132.3     1200     133.2     1210
GR     133.7    1220     134.2     1230     134.3     1235     137.2     1240     139.5     1260
GW     140.9    1370     141.5     1590     143.1     1930     153.8     2070     156.3     2220
GR     163.9    2400     175.8     2560

ET                                                  9.11                                    1490      3600
X1  216920      29    1520    1589    2560    2560    2560
GR     156.4     200     161.0     320     166.9     405     166.0     525     159.2     720
GR     153.8     920     147.1     1260     143.5     1480     138.1     1520     135.0     1525
GR     134.1    1530     133.6     1540     132.9     1550     134.1     1560     134.6     1570
GR     135.1    1580     138.1     1589     140.0     1630     145.8     1690     144.8     1950
GR     144.3    2240     145     2860     144.1     2930     143.8     3230     142.8     3700
GR     142.1    3880     141.6     4040     145.8     4140     152.0     4500

NB     4     0.30     1480     0.12     1520     0.055     1589     0.12     4500
ET                                                  9.11                                    1490      4000
X1  217120      26    1520    1589     200     200     200
GR     156.4     200     161.0     320     166.9     405     166.0     525     159.2     720
GR     153.8     920     147.1     1260     143.5     1480     138.1     1520     135.0     1525
GR     134.1    1530     133.6     1540     132.9     1550     134.1     1560     134.6     1570
GR     135.1    1580     138.1     1589     140.0     1630     145.8     1690     144.8     1950
GR     144.3    2240     145     3000     146     4000     148     4500     155     5000
GR     160     5200
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MC    0.12    0.12    0.055
ET                                                  9.11                                    1490      4000
X1  217390      26    1530    1589     210     270     270
X3     10                                                                   146.6     141.6
GR     156.4     300     161.0     320     166.9     405     166.0     525     159.2     720
GR     153.8     920     147.1     1260     143.5     1480     138.1     1520     135.0     1525
GR     134.1    1530     133.6     1540     132.9     1550     134.1     1560     134.6     1570
GR     135.1    1580     138.1     1589     140.0     1630     145.8     1690     144.8     1950
GR     144.3    2240     145     3000     146     4000     148     4500     155     5000
GR     160     5200

SB     1     1.5     2.5       0      42     .1     581     1.11     136.0     136.0
ET                                                  9.11                                    1490      4000
1
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X1  217410                                      20      20      20
X2                              1     146.6     141.6
X3     10                                                                   147.6     142.1
BT     18     200     156.4       0     320     161.0       0     405     166.9       0
BT    525     166.0       0     720     159.2       0     920     153.8       0    1260
BT    147.1       0    1410     140.5       0    1530     148.9     146.6    1589     148.9
BT    146.8    1690     145.8       0    1950     144.8       0    2240     144.3       0
BT   3000     145       0    4000     146       0    4500     148       0    5000
BT    155       0    5200     160

ET                                                  9.11                                    1490      4000
X1  217636      26    1520    1589     226     226     226
GR     156.4     200     161.0     320     166.9     405     166.0     525     159.2     720
GR     153.8     920     147.1     1260     143.5     1480     138.1     1520     135.0     1525
GR     134.1    1530     133.6     1540     132.9     1550     134.1     1560     134.6     1570
GR     135.1    1580     138.1     1589     140.0     1630     145.8     1690     144.8     1950
GR     144.3    2240     145     3000     146     4000     148     4500     155     5000
GR     160     5200

MC    0.12    0.12    0.055
ET                                                  9.11                                    1330      2300
X1  220320      32    1485    1530    2884    2884    2884
GW     162.7     200     165.3     270     169.0     460     168.2     760     161.5     1010
GR     154.3    1255     140.0     1460     138.1     1485     137.3     1490     135.3     1500
GR     135.1    1510     135.6     1520     137.1     1525     139.1     1530     142.0     1565
GR     145.2    1810     142.2     1960     147.9     2180     152.5     2315     154.6     2450
GR     157.2    2670     157.2     2895     154.2     3200     154.0     3290     154.0     3450
GR     154    3630     155    3900     157.3     4910     162.1     5050     172.5     5285
GR     172.5    5570     170.2     5890

ET                  9.11    9.11    9.11                                    3300      4500
ET                                                  9.11                                    3400      3850
X1  222812      21    3640    3700    2292    2100    2292
GR     165    1500     160    1900     152    2850     149    2800     148    3400
GR     145.5    3600     140.5    3630     138.7    3635     137.6    3640     137.1    3650
GR     137.8    3660     136.5    3670     137.0    3680     137.6    3690     138.5    3695
GR     140.5    3700     144.0    3720     148    3750     150    3900     152    4000
GR     160    4150                                                                    3500      3750

ET                  9.11    9.11    9.11                                    3400      4500
ET                                                  9.11                                    3500      3750
X1  223312       0       0       0     500     500     500
MC    0.12    0.12    0.055
ET                                                  9.11                                    3539      3741
X1  223445      27    3539    3741     133     133     133
X3     10                                                                   155.0     155.0
GR     174.6     30     172.1     340     172.8     590     162.2     830     156.0     1100
GR     150.7    1410     147.3     1960     145.0     2310     145.3     2740     146.7     3150
GR     144.1    3579     144.0     3660     140.5     3630     138.7     3635     137.6     3640
GR     137.1    3650     137.0     3660     136.5     3670     137.0     3680     137.6     3690
GR     138.5    3695     140.5     3700     144.0     3720     157.6     3741     165.7     3755
GR     170.4    3940     175.0     4140
1
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SB    1.25     1.5     2.5       0      39       3     1311     2.75     138.5     138.5
ET                                                  9.11                                    3539      3741
X1  223475                                      30      30      30
X2                              1     154.4     156.8
X3     10                                                                   157.3     159.0
BT     18     200     157.1       0     490     173.9       0     740     171.2       0
BT    960     165.9       0    1310     154.2       0    1730     157.1       0    2070
BT    156.9       0    2440     156.8       0    2610     156.8       0    2865     157.0
BT      0    3130     157.3       0    3490     157.6       0    3578     157.8     154.4
BT   3660     157.8     154.4    3741     158.5     134.4    3755     165.7       0    3940
BT    170.4       0    4140     175.0       0

ET                  9.11    9.11    9.11                                    3350      3900
ET                                                  9.11                                    3350      3725
X1  223620      25    3640    3700     145     145     145
GR     174.6     30     173.1     340     172.8     590     162.2     830     156.0     1100
GR     150.7    1410     147.3     1958     145.0     2310     145.3     2740     146.7     3150
GR     145.5    3600     140.5     3638     138.7     3635     137.6     3640     137.1     3650
GR     137.8    3660     136.5     3670     137.0     3680     137.6     3690     138.5     3695
GR     140.5    3700     144.0     3720     165.7     3755     170.4     3940     175.0     4140

MC    0.12    0.12    0.055
ET                  9.11    9.11    9.11                                    3700      3900
ET                                                  9.11                                    3700      3725
X1  224000       0       0       0     380     380     380
ET                                                  9.11                                    2000      4300
X1  229080      30    3960    3020    4200    4200    5080
GR     164.8     280     162.1     600     162.4     920     156.2    1240     151.1     1420
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GR   151.7    1590    147.6    1985    151.2    2170    150.3    2500    152.8    2815
GR   144.0    2940    142.3    2960    139.8    2965    138.3    2970    137.8    2960
GR   137.2    2990    137.9    3000    138.2    3010    139.3    3015    142.3    3020
GR   148.0    3030    152.7    2910    154.6    4000    151.3    4595    161.5    4860
GW   182.2    5040    185.2    5405    171.5    5730    176.4    5900    173.5    6020

ET                                     9.11                             0970     1975
X1  234970      24    1895     1940     5000     5840     5840
GR   165.8     175    166.0      285    164.5      470    157.7      675    153.1      815
GR   151.5     930    150.3     1180    153.6     1375    150.5     1545    148.7     1805
GR   148.0    1875    144.8     1895    141.8     1900    141.0     1905    140.8     1915
GR   140.8    1925    141.1     1935    144.8     1940    148.0     1955    157.1     2095
GW   164.2    2205    177.4     2325    185.7     2470    188.6     2815

MC    0.12     0.12    0.055
ET                                     9.11                             0960     1963
X1  235026      26    1859     1963      106      106      106
X3      10                                                    154.8    159.8
GR   165.0     175    166.0      285    164.5      470    157.7      675    153.1      815
GR   151.5     930    150.3     1180    153.6     1375    150.5     1545    148.7     1805
GR   148.1    1859    148.8     1875    144.8     1895    141.8     1900    141.0     1905
GR   140.8    1915    140.8     1925    141.1     1935    144.8     1940    148.0     1955
GR   148.5    1965    157.1     2095    164.2     2205    177.4     2325    185.7     2470
GR   188.6    2815
1
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SR    1.25     1.5      2.5       0       38      3.4      834     2.36    144.5     144.0
ET                                     9.11                             0963     1963
X1  235954                             28       28       28
X2                        1     156.8    155.4
X3      10                                                    156.0    160.3
ST      14      200    163.5       0      930    160.4        0      850    157.5        0
ST    1210    155.4        0    1545    157.0        0     1790    158.6        3     1859
ST   159.8    156.8     1915    159.8    156.4     1963    159.8    156.8     2690    163.0
ST       0     2280    170.8        0     2325    177.4        0     2470    185.7        0
ST    2815    188.6        0

ET                                     9.11                             0970     1975
X1  235156      24    1895     1940      102      102      102
GR   165.8     175    166.0      285    164.5      470    157.7      675    153.1      815
GR   151.5     930    150.3     1190    153.6     1375    150.5     1545    148.7     1805
GR   148.0    1895    144.8     1895    141.8     1908    141.0     1905    140.8     1915
GR   140.8    1925    141.1     1935    144.8     1940    148.0     1955    157.1     2095
GR   164.2    2205    177.4     2325    185.7     2470    188.6     2815

ET                                     9.11                             1095     2385
X1  237560      23    2325     2368     2000     2100     2484
GR   167.2     200    165.8      365    166.1      530    161.6      700    155.3      830
GR   156.5    1070    155.8     1290    154.7     1490    157.8     1670    155.5     1990
GR   154.9    2250    148.5     2310    146.1     2325    144.1     2330    142.4     2340
GR   141.1    2350    143.4     2355    146.1     2360    148.0     2380    188.0     2460
GR   200.8    2660    197.4     2920    194.1     3110

ET                                     9.11                             1550     2950
X1  240010      28    2895     2925     2450     2450     2450
GR   181.7     200    173.7      440    172.5      680    172.2      890    156.8     1210
GR   156.9    1400    156.8     1600    156.9     1815    154.1     2160    156.2     2405
GR   153.2    2650    152.4     2805    152.8     2860    147.8     2895    145.8     2900
GR   144.8    2910    144.1     2915    144.8     2920    147.8     2925    152.8     2945
GR   155.8    2980    158.7     3120    163.5     3310    175.4     3490    181.0     3580
GR   199.0    3705    189.7     3920    195.3     4170

ET                                     9.11                             1550     2950
X1  242510       0        0        0     2500     2500     2500                1.0

ET                                     9.11                             2150     4150
X1  243920      31    3285     3335     1410     1410     1410
GR   185.5     200    182.7      435    174.6      700    167.9      940    165.0     1150
GR   164.2    1510    164.7     1910    164.3     2230    162.3     2500    155.2     2800
GR   152.5    3020    152.0     3230    149.6     3270    149.0     3295    148.8     3290
GR   148.5    3308    145.6     3310    146.6     3328    147.1     3330    148.4     3335
GR   149.6    3340    151.2     3390    151.8     3830    158.0     4300    165.2     5000
GR   171.5    5610    181.5     5770    193.8     5835    207.5     6130    211.3     6210
GR   207.1    6530
1
    17JUL01     08:40:18                                                                PAGE  32


ET                 9.11     9.11     9.11     9.11                             2500     5590
ET                                                     9.11                     3100     4600
X1  245070      21    3295     3335     1150     1150     1150
GR   180     1190      176      1180      172      1530      168      1730      164      2280
GR   160     2530      160      2650      156      3230      151.6    3295      149.1    3300
GR   148.1   3310    147.8      3320    149.2     3330      151.6    3335      152      3400
GR   152     4750      156      4870      158      5090      160      5320      176      5480
GR   180     5590

ET                 9.11     9.11     9.11     9.11                             3100     4450
ET                                                     9.11                     2150     3600
X1  246705      23    3295     3335     1630     1630     1630
GR   180      390      176       500      172       610      168       700      164      1530
GR   160     1900      160      2700      166.3     2960      160      3250      152.8    3295
GR   150.3   3308    149.3      3330      148.8     3370      150.4    3330      152.8    3335
GR   152     3360      156      3400      158       3600      160      4150      164      4200
GR   168     4295      172      4400      190       4459

ET                                                     9.11                     3200     4400
X1  248150      22    3295     3335     1450     1450     1450
GR   180     1170      176      1830      172      1905      168.5    2500      168      3108
GR   164     3200      160      3288      154.1    3295      151.8    3300      159.6    3318
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GR   149.3    3320    151.7    3330    154.1    3335      156    3290      158    3470
GR   159.8    3620      160    4460      164    4530      168    4620      172    4710
GR   176      5420      180    5600

ET                                     9.11                             3000     2200
X1  249830      21    2095     2135     1680     1680     1680
GR   183.1     200    176.5      475    164.3      755    160.2    1080    162.1     1480
GR   162.9    1880    162.8     2040    168.0     2690    155.9    2095    152.8     2100
GR   151.8    2110    150.5     2120    152.9     2130    155.3    2135    159.3     2170
GR   160.0    2190    164.0     2370    168.0     2400    173.7    2620    171.6     2640
GR   172.7    3065

ET                                     9.11                             1000     2350
X1  251060      19    1030     1085     1230     1230     1230
GR   182.5     180    171.1      420    175.0      650    164.9      920    160.0     1010
GR   154.1    1030    154.1     1035    151.6     1050    152.2     1060    154.1     1080
GR   156.1    1085    160.8     1110    161.7     1250    161.4     1490    161.7     1895
GR   160.9    2225    160.2     2600    172.5     2995    175.5     3325

MC    0.12     0.12    0.055
ET                                     9.11                             1000     2500
X1  251227      21    1020     1100      167      167      167
X3      10                                                    166.5    165.8
GR   182.5     180    171.1      420    175.0      650    164.9      920    160.0     1010
GR   158.0    1020    156.1     1030    154.1     1035    151.6     1050    152.2     1060
GR   154.1    1080    156.1     1085    158.5     1100    160.0     1110    161.7     1250
GR   161.4    1490    161.7     1885    160.9     2725    160.2     2600    172.5     2985
GR   175.5    3325
1
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SR    1.25     1.5      2.5       0       49      2.0      792     1.05    153.5     153.5
ET                                     9.11                             1000     2500
X1  251253                                       26       26
X2                        1     166.4    164.6
X3      10                                                    166.7    165.1
BT      14      200    180.2       0      350    177.3        0      545    172.8        0
BT     835    166.2        0    1020    168.4    166.4     1100    168.4    166.4     1225
BT   168.1        0    1430    167.0        0     1560    166.1        0     1900    164.7
BT       0     2275    164.6        0     2650    168.0        0     3135    170.4        0
BT    3450    173.6        0

ET                                     9.11                             1000     2500
X1  251360      19    1030     1085      107      107      107
GR   182.5     180    171.1      420    175.0      650    164.9      920    160.0     1010
GR   156.1    1030    154.1     1035    151.6     1050    152.2     1060    154.1     1080
GR   156.1    1085    160.8     1110    161.7     1250    161.4     1490    161.7     1885
GR   160.9    2225    160.2     2600    172.5     2995    175.5     3325

ET                                     9.11                             1000     2500
X1  251560       0        0        0      200      200      200

ET                                     9.11                             1120     3120
X1  253550      19    3030     3085     0800     1940
GR   180      550      172       780      168     1000    165.1    2000    165.1     2700
GR   164     3000    161.0     3015    157.1     3030    155.1    3035    152.6     3050
GR   153.2    3060    155.1     3080    157.1     3085    161.0    3100      164     3180
GR   168     3230      176     3470      180     3700

MC    0.12     0.12    0.055
ET                                     9.11                             2900     3300
X1  256530      24    3090     3130     2980     2980     2980
GR   208.9     200    198.6      265    190.6      615    186.1      940    183.1     1200
GR   180.6    1450    176.8     1855    175.8     2275    175.3     2570    167.2     2955
GR   160.0    3070    158.0     3090    155.0     3095    154.0     3100    152.7     3110
GR   153.9    3120    155.2     3125    158.0     3130    160.0     3155    174.2     3435
GR   182.5    3400    196.4     4160    212.4     4605    218.2     5025

ET                                     9.11                             2225     3725
X1  261680      27    3840     3700     5150     5158     5150
GR   189.3     200    195.0      410    185.8      715    179.2    1035    176.5     1415
GR   174.6    1705    168.0     2155    169.2     2490    169.2     2810    168.4     3080
GR   171.9    3358    168.0     3465    160.0     3615    159.2     3640    158.7     3645
GR   156.1    3658    159.2     3660    154.8     3670    155.3     3680    158.7     3695
GR   159.2    3708    160.0     3725    198.4     3900    222.8     4110    222.4     4280
GR   227.1    4630    228.3     4740

ET                                     9.11                             1800     2200
X1  264830      23    1840     1905     3150     3150     3150
GR   197.8     200    199.9      401    198.1      520    194.5      600    188.8      855
GR   186.0    1180    188.8     1425    182.5     1615    184.0     1815    182.9     1840
GR   178.4    1845    176.8     1860    176.4     1870    176.8     1880    178.4     1900
GR   180.9    1905    184.0     1925    171.5     2185    182.3     2540    204.6     2870
GR   211.4    3698    219.2     3750    213.4     3810
1
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ET                                     9.11                             1100     1350
X1  265740      20    1225     1270      950      950      950
GR   187.8     210    185.8      475    186.2      670    183.2      870    174.5     1060
GR   164.0    1195    162.5     1225    159.7     1230    158.8     1240    157.7     1250
GR   158.8    1260    159.5     1265    162.5     1270    164.8     1295    170.1     1445
GR   180.0    1615    203.8     1880    208.5     2020    219.8     2175    239.5     2415

MC    0.12     0.12    0.055
ET                                     9.11                             1190     1300
X1  265908      22    1190     1700      128      128      128
X3      18                                                    178.5    178.5
GR   187.8     210    185.8      475    186.2      670    183.2      870    174.5     1060
GR   164.4    1190    164.8     1195    162.5     1225    159.7     1230    158.8     1240
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GR    157.7     1250     158.8     1260     159.5     1265     162.5     1270     164.4     1285
GR    165.1     1300     170.1     1445     180.0     1670     203.0     1860     208.3     2020
GR    215.8     2175     239.5     2415

SB      .90      1.5      2.5        0       80       4.0     1610      .72     160.0     160.0
ET                                             8.11                          1145      1300
X1  265932                                     24        24
X2                                1     176.7     180.2
X3       10                                                        180.7     180.7
RT       12      200      189.5        0      490     185.8        0      640     184.5        0
RT      970     192.3        0     1190     180.2     176.7     1360     180.2     176.7     1425
RT    183.5        0     1660     186.0        0      1990     203.5        0      3255     214.7
RT        0     2510     215.6        0     2745     214.5        0

ET                                             9.11                          1150      1350
X1  266050       20     1225     1270      110      110      110
GR    167.9      230     185.8      475     186.2      670     183.2      870     174.5     1060
GR    164.9     1195     162.5     1225     159.7     1230     158.8     1240     157.7     1250
GR    158.8     1260     159.5     1265     162.5     1270     164.4     1295     178.1     1445
GR    180.8     1670     203.0     1860     208.5     2020     219.8     2175     239.5     2415

ET                                             9.11                          1100      1400
X1  266420        0        0        0     0380     0380     0380                    0.3

ET                                             9.11                          1550      1950
X1  267038       19     1655     1695     1708     1708     1708                   -0.9
GR    210.1      410     196.5      715     187.2     1080     183.8     1350     173.1     1510
GR    168.0     1625     164.5     1655     161.7     1660     160.5     1670     160.5     1680
GR    161.6     1690     164.5     1695     167.1     1725     183.2     2060     206.1     2325
GR    222.3     2515     226.6     2690     244.1     2995     248.5     3245

MC     0.12     0.12     0.055
ET                                             9.11                          1606      1754
X1  267815       21     1606     1754      177      177      177                   -.4
X3       10                                                        181.5     181.5
GR    210.1      410     196.5      715     187.2     1080     183.8     1350     173.1     1510
GR    169.2     1606     168.0     1635     164.5     1655     161.7     1660     160.5     1670
GR    160.5     1680     161.6     1690     164.5     1695     167.1     1725     188.5     1754
GR    183.2     2060     206.1     2325     222.3     2515     226.6     2690     244.1     2995
GR    248.5     3245
1
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SB      1.25      1.5      2.5        0       60       3.0     2060      2.58     161.5     161.5
ET                                             9.11                          1606      1754
X1  267845                                     30        30        30
X2                                1     181.0     185.0
X3       10                                                        185.5     185.5
RT       14      200      208.1        0      460     203.0        0      725     197.5        0
RT     1010     191.5        0     1330     187.6        0     1606     185.0     181.0     1754
RT    185.0     181.0     1870     186.8        0     2065     190.8        0     2280     194.1
RT        0     2410     204.4        0     2710     216.9        0     3040     238.5        0
RT     3355     226.1        0

ET                                             9.11                          1550      1950
X1  267940       19     1655     1695       95       95       95
GR    210.1      410     196.5      715     187.2     1080     183.8     1350     173.1     1510
GR    168.0     1635     164.5     1655     161.7     1660     160.5     1670     160.5     1680
GR    161.6     1690     164.5     1695     167.1     1725     183.2     2060     206.1     2325
GR    222.3     2515     226.6     2690     244.1     2995     248.5     3245

MC     0.12     0.12     0.055
ET                                             9.11                          1550      1950
X1  268647        0        0        0      707      707      707

ET                                             9.11                          1550      1950
X1  268648       16     1570     1790        1        1        1
GR    209.3      200     198.1      555     187.1      875     182.5     1120     187.9     1320
GR    178.0     1425     177.2     1488     170.0     1569     168.5     1570     168.5     1660
GR    170.0     1661     170.0     1790     182.5     2015     202.5     2280     217.5     2500
GR    239.5     2800

ET                                             9.11                          1550      1950
X1  268651        0        0        0        3        3        3

ET                                             9.11                          1550      1950
X1  268652       19     1655     1695        1        1        1
GR    210.1      410     196.5      715     187.2     1080     183.8     1350     173.1     1510
GR    168.0     1635     164.5     1655     161.7     1660     160.5     1670     160.5     1680
GR    161.6     1690     164.5     1695     167.1     1725     183.2     2060     206.1     2325
GR    222.3     2515     226.6     2690     244.1     2995     248.5     3245

ET                                             9.11                          1550      1950
X1  268653        0        0        0        1        1        1

ET                                             9.11                          1550      1950
X1  268654        0        0        0        1        1        1

ET                                             9.11                          1550      1950
X1  268655        0        0        0        1        1        1
1
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ET                                             9.11                          1550      1950
X1  268656        0        0        0        2        2        2

ET                                             9.11                          1550      1950
X1  268660        0        0        0        3        3        3

ET                                             9.11                          1550      1950
X1  268700        0        0        0       40       40       40

ET                                             9.11                          1550      1950
X1  269000        3        0        0     0300     0300     0300
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ABBREVIATED OUTPUT - ACTUAL OUTPUT OVER 200 PAGES

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LITTLE RIVER

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWEX	DIFKWS	TOPWID	XLCH
1.000	6816.00	61.60	.00	.00	.00	908.00	.00
1.000	12512.00	70.50	8.40	.00	8.40	1626.11	.00
1.000	15660.00	71.40	1.40	.00	9.80	1633.00	.00
1.000	26100.00	73.60	2.20	.00	.00	2182.46	.00
150.000	6816.00	61.71	.00	.11	.00	921.55	150.00
150.000	12512.00	70.01	8.30	.61	8.30	1626.17	150.00
150.000	15660.00	71.41	1.40	.01	9.70	1623.07	150.00
150.000	26100.00	73.62	2.20	.02	.00	2182.62	150.00
300.000	6816.00	61.95	.00	.24	.00	1477.24	150.00
300.000	12512.00	70.05	8.09	.03	8.09	2009.31	150.00
300.000	15660.00	71.45	1.40	.03	9.50	2017.81	150.00
300.000	26100.00	73.65	2.20	.03	.00	2775.49	150.00
500.000	6816.00	62.14	.00	.19	.00	1396.66	200.00
500.000	12512.00	70.06	7.91	.01	7.91	1989.46	200.00
500.000	15660.00	71.46	1.40	.01	9.32	1917.97	200.00
500.000	26100.00	73.67	2.20	.02	.00	2776.04	200.00
900.000	6816.00	62.38	.00	.23	.00	988.12	400.00
900.000	12512.00	70.08	7.70	.02	7.70	1380.00	400.00
900.000	15660.00	71.48	1.40	.02	9.10	1300.00	400.00
900.000	26100.00	73.69	2.21	.03	.00	2133.46	400.00
1400.000	6816.00	62.57	.00	.19	.00	657.18	500.00
1400.000	12512.00	70.10	7.53	.02	7.53	900.00	500.00
1400.000	15660.00	71.50	1.40	.02	8.93	900.00	500.00
1400.000	26100.00	73.72	2.22	.03	.00	3043.23	500.00
2485.000	6816.00	63.72	.00	1.15	.00	430.00	1085.00
* 2485.000	12512.00	70.31	6.60	.22	6.60	430.00	1085.00
* 2485.000	15660.00	71.72	1.41	.22	8.00	430.00	1085.00
* 2485.000	26100.00	73.58	1.86	-.14	9.47	1190.82	1085.00
2535.000	6816.00	63.98	.00	.27	.00	400.00	50.00
2535.000	12512.00	70.40	6.41	.09	6.41	400.00	50.00
2535.000	15660.00	71.81	1.42	.09	7.83	400.00	50.00
2535.000	26100.00	73.87	2.06	.29	9.89	1248.63	50.00
2585.000	6816.00	64.07	.00	.09	.00	317.93	60.00
2585.000	12512.00	70.49	6.42	.10	6.42	400.00	60.00
2585.000	15660.00	71.94	1.45	.13	7.87	627.22	60.00
2585.000	26100.00	73.93	1.99	.06	9.86	1084.68	60.00

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SECNO	Q	CWSEL	DIFWSP	DIFWEX	DIFKWS	TOPWID	XLCH
2605.000	6816.00	64.09	.00	.02	.00	387.33	10.00
2605.000	12512.00	70.87	6.78	.38	6.78	400.00	10.00
2605.000	15660.00	72.53	1.68	.65	8.46	1069.05	10.00
2605.000	26100.00	75.10	2.55	1.17	11.01	1157.44	10.00
* 2615.000	6816.00	64.17	.00	.08	.00	218.14	10.00
2615.000	12512.00	70.82	6.65	-.06	6.65	425.00	10.00
2615.000	15660.00	72.41	1.66	-.09	8.30	425.00	10.00
2615.000	26100.00	74.99	2.52	-.11	10.82	1078.58	10.00
2675.000	6816.00	64.18	.00	.01	.00	500.00	60.00
2675.000	12512.00	70.88	6.70	.06	6.70	500.00	60.00
2675.000	15660.00	72.56	1.67	.07	8.36	500.00	60.00
2675.000	26100.00	75.16	2.62	.17	10.98	1280.55	60.00
2735.000	6816.00	64.29	.00	.21	.00	583.57	60.00
2735.000	12512.00	70.99	6.66	.11	6.66	660.00	60.00
2735.000	15660.00	72.67	1.69	.13	8.26	660.00	60.00
2735.000	26100.00	75.29	2.62	.13	10.90	1255.68	60.00
4400.000	6816.00	61.62	.00	1.24	.00	673.07	1665.00
4400.000	12512.00	71.43	5.81	.45	5.81	1329.19	1665.00
4400.000	15660.00	73.17	1.70	.46	7.50	1282.32	1665.00
4400.000	26100.00	75.83	2.60	.54	10.10	1887.22	1665.00
5900.000	6816.00	66.78	.00	1.16	.00	880.64	1500.00
5900.000	12512.00	71.80	5.01	.36	5.01	1738.48	1500.00
5900.000	15660.00	73.45	1.66	.32	6.67	1923.53	1500.00
5900.000	26100.00	76.32	2.87	.60	9.54	2341.91	1500.00

*	7260.000	6816.00	61.44	.00	.66	.00	1386.36	1300.00
*	7260.000	12512.00	72.08	4.64	.29	4.64	1529.52	1300.00
	7260.000	15660.00	73.70	1.62	.25	8.26	1536.32	1300.00
	7260.000	26100.00	76.61	2.91	.28	9.17	1619.19	1300.00
*	8070.000	6816.00	67.61	.00	.23	.00	700.00	670.00
*	8070.000	12512.00	72.16	4.49	.00	4.49	700.00	670.00
*	8070.000	15660.00	73.77	1.61	.07	8.10	700.00	670.00
	8070.000	26100.00	76.74	2.97	.13	9.06	2177.42	670.00
	8110.000	6816.00	67.56	.00	-.09	.00	314.83	40.00
	8110.000	12512.00	71.99	4.41	-.13	4.41	389.86	40.00
*	8110.000	15660.00	73.57	1.57	-.20	5.99	628.72	40.00
*	8110.000	26100.00	76.37	2.81	-.36	8.79	1917.48	40.00
	8135.000	6816.00	67.59	.00	.01	.00	273.96	25.00
	8135.000	12512.00	71.97	4.38	-.02	4.38	314.61	25.00
	8135.000	15660.00	73.53	1.56	-.04	5.94	471.47	25.00
	8135.000	26100.00	76.17	2.64	-.20	8.58	735.00	25.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
	8170.000	6816.00	67.90	.00	.31	.00	680.00	35.00
*	8170.000	12512.00	72.39	4.49	.42	4.49	680.00	35.00
*	8170.000	15660.00	74.02	1.63	.49	6.12	680.00	35.00
*	8170.000	26100.00	76.95	2.93	.78	9.05	680.00	35.00
	8735.000	6816.00	68.13	.00	.23	.00	280.00	565.00
*	8735.000	12512.00	72.42	4.28	.03	4.28	280.00	565.00
*	8735.000	15660.00	74.00	1.58	-.03	5.86	280.00	565.00
*	8735.000	26100.00	76.76	2.77	-.18	8.63	280.00	565.00
	8825.000	6816.00	68.23	.00	.10	.00	310.00	90.00
	8825.000	12512.00	72.53	4.30	.12	4.30	310.00	90.00
	8825.000	15660.00	74.13	1.60	.14	5.90	310.00	90.00
	8825.000	26100.00	77.02	2.88	.25	8.79	310.00	90.00
	8855.000	6816.00	68.15	.00	-.08	.00	270.00	30.00
	8855.000	12512.00	72.42	4.27	-.11	4.27	270.00	30.00
	8855.000	15660.00	74.00	1.58	-.13	5.85	270.00	30.00
	8855.000	26100.00	76.77	2.77	-.25	8.62	270.00	30.00
	8870.000	6816.00	68.26	.00	.22	.00	223.61	15.00
	8870.000	12512.00	72.71	4.34	.28	4.34	254.35	15.00
	8870.000	15660.00	74.35	1.64	.35	5.98	285.98	15.00
	8870.000	26100.00	77.47	3.13	.70	9.11	283.00	15.00
	8885.000	6816.00	68.35	.00	-.01	.00	197.45	15.00
	8885.000	12512.00	72.67	4.32	-.04	4.32	224.90	15.00
	8885.000	15660.00	74.30	1.63	-.05	5.95	235.27	15.00
*	8885.000	26100.00	77.22	2.91	-.26	8.87	260.39	15.00
	8915.000	6816.00	68.38	.00	.03	.00	197.62	30.00
	8915.000	12512.00	72.70	4.32	.03	4.32	225.05	30.00
	8915.000	15660.00	74.33	1.63	.03	5.95	235.43	30.00
	8915.000	26100.00	77.34	3.01	.13	8.96	280.39	30.00
	8945.000	6816.00	68.45	.00	.07	.00	224.23	30.00
	8945.000	12512.00	72.80	4.34	.10	4.34	254.99	30.00
	8945.000	15660.00	74.45	1.65	.12	6.00	266.69	30.00
*	8945.000	26100.00	77.88	3.43	.54	9.43	283.00	30.00
	8958.000	6816.00	68.34	.00	-.11	.00	267.73	5.00
	8958.000	12512.00	72.65	4.32	-.14	4.32	290.00	5.00
	8958.000	15660.00	74.28	1.63	-.17	5.94	290.00	5.00
	8958.000	26100.00	77.53	3.25	-.31	9.23	290.00	5.00
	9075.000	6816.00	68.60	.00	.27	.00	420.00	120.00
	9075.000	12512.00	72.99	4.39	.33	4.39	420.00	120.00
	9075.000	15660.00	74.67	1.68	.39	6.07	420.00	120.00
	9075.000	26100.00	78.24	3.57	.68	9.64	420.00	120.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
	10360.000	6816.00	69.35	.00	.14	.00	1232.27	1285.00
*	10360.000	12512.00	73.61	4.26	.62	4.26	1324.55	1285.00
*	10360.000	15660.00	75.33	1.72	.66	5.98	1353.39	1285.00
*	10360.000	26100.00	79.05	3.72	.80	9.70	2288.53	1285.00
*	13400.000	6816.00	70.06	.00	.71	.00	2011.32	3040.00
	13400.000	12512.00	74.03	3.97	.41	3.97	2281.62	3040.00
	13400.000	15660.00	75.71	1.68	.38	5.65	2393.75	3040.00
	13400.000	26100.00	79.26	3.56	.22	9.21	3830.48	3040.00
	15400.000	6816.00	70.44	.00	.38	.00	1077.15	2800.00
*	15400.000	12512.00	74.26	3.82	.23	3.82	1055.63	2800.00
*	15400.000	15660.00	75.91	1.66	.21	5.48	1072.18	2800.00
*	15400.000	26100.00	79.40	3.48	.13	8.96	1138.57	2800.00
*	16435.000	6816.00	70.74	.00	.31	.00	400.00	1035.00
*	16435.000	12512.00	74.40	3.65	.14	3.65	400.00	1035.00
*	16435.000	15660.00	76.00	1.61	.09	5.26	400.00	1035.00
*	16435.000	26100.00	79.39	3.38	-.01	8.65	400.00	1035.00
	16785.000	6816.00	71.02	.00	.28	.00	171.38	270.00
	16785.000	12512.00	74.59	3.57	.19	3.57	174.85	270.00
	16785.000	15660.00	76.15	1.56	.14	5.13	172.09	270.00
	16785.000	26100.00	79.42	3.28	.04	8.40	172.60	270.00
	16725.000	6816.00	71.05	.00	.02	.00	171.23	20.00
	16725.000	12512.00	74.61	3.57	.03	3.57	171.67	20.00
	16725.000	15660.00	76.17	1.56	.03	5.13	172.06	20.00
	16725.000	26100.00	79.46	3.29	.04	8.42	172.26	20.00
	16755.000	6816.00	71.08	.00	.04	.00	171.24	30.00
	16755.000	12512.00	74.65	3.57	.04	3.57	171.67	30.00
	16755.000	15660.00	76.22	1.56	.04	5.13	171.86	30.00
	16755.000	26100.00	79.53	3.31	.06	8.44	193.19	30.00
	16770.000	6816.00	71.14	.00	.05	.00	190.29	15.00
	16770.000	12512.00	74.76	3.62	.11	3.62	193.02	15.00
	16770.000	15660.00	76.36	1.60	.14	5.22	194.23	15.00
	16770.000	26100.00	79.81	3.45	.28	8.67	196.84	15.00
	16785.000	6816.00	71.24	.00	.10	.00	193.78	15.00
	16785.000	12512.00	74.89	3.65	.13	3.65	209.25	15.00
	16785.000	15660.00	76.51	1.62	.15	5.27	214.33	15.00
	16785.000	26100.00	80.18	3.69	.29	8.86	1207.89	15.00
	16815.000	6816.00	71.26	.00	.02	.00	197.88	30.00
	16815.000	12512.00	74.92	3.65	.03	3.65	209.34	30.00
	16815.000	15660.00	76.54	1.62	.03	5.27	214.42	30.00
	16815.000	26100.00	80.14	3.60	.04	8.88	1264.99	30.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
	16845.000	6816.00	71.24	.00	-.02	.00	198.37	30.00
	16845.000	12512.00	74.88	3.64	-.04	3.64	193.11	30.00
	16845.000	15660.00	76.48	1.61	-.05	5.24	194.23	30.00
	16845.000	26100.00	80.02	3.53	-.12	8.78	196.99	30.00
	16875.000	6816.00	71.24	.00	.10	.00	300.00	30.00
	16875.000	12512.00	75.02	3.68	.14	3.68	300.00	30.00
	16875.000	15660.00	76.66	1.64	.17	5.32	300.00	30.00
	16875.000	26100.00	80.21	3.66	.29	8.88	300.00	30.00
*	19900.000	6816.00	72.82	.00	1.49	.00	1267.01	3025.00
*	19900.000	12512.00	76.46	3.64	1.44	3.64	1334.55	3025.00
*	19900.000	15660.00	78.13	1.67	1.49	5.31	1356.81	3025.00
*	19900.000	26100.00	81.77	3.64	1.46	8.95	6935.41	3025.00
	22800.000	6816.00	74.06	.00	1.23	.00	1650.47	2900.00
	22800.000	12512.00	77.24	3.18	.78	3.18	1859.64	2900.00
	22800.000	15660.00	78.80	1.56	.67	4.74	1880.00	2900.00
	22800.000	26100.00	82.05	3.25	.28	8.00	6541.33	2900.00
*	25800.000	6816.00	75.28	.00	1.14	.00	1438.66	3000.00
	25800.000	12512.00	78.02	2.82	.76	2.82	2863.03	3000.00
	25800.000	15660.00	79.44	1.42	.64	4.24	2700.00	3000.00
*	25800.000	26100.00	82.32	2.88	.26	7.12	8286.27	3000.00
*	28900.000	6816.00	76.29	.00	1.10	.00	2146.69	3100.00
*	28900.000	12512.00	78.88	2.58	.66	2.58	2574.39	3100.00
	28900.000	15660.00	80.15	1.27	.71	3.85	2580.73	3100.00
*	28900.000	26100.00	82.60	2.45	.26	6.30	6233.29	3100.00
*	32400.000	6816.00	77.81	.00	1.52	.00	3592.45	3500.00
*	32400.000	12512.00	79.85	2.03	.97	2.03	3719.93	3500.00
*	32400.000	15660.00	80.93	1.08	.78	3.12	3759.86	3500.00
	32400.000	26100.00	83.20	2.27	.50	5.29	7690.36	3500.00
*	36600.000	6816.00	79.19	.00	1.38	.00	809.77	4200.00
*	36600.000	12512.00	81.11	1.92	1.27	1.92	2317.89	4200.00
*	36600.000	15660.00	82.05	.94	1.12	2.86	3260.24	4200.00
*	36600.000	26100.00	83.98	1.93	.88	4.79	3648.64	4200.00
	38200.000	6816.00	79.98	.00	.80	.00	2081.90	1700.00
*	38200.000	12512.00	82.34	2.35	1.03	2.35	3148.03	1700.00
*	38200.000	15660.00	83.04	.70	.98	3.05	3306.82	1700.00
*	38200.000	26100.00	84.97	1.93	.69	4.98	3649.69	1700.00
	40100.000	6816.00	80.10	.00	.71	.00	1458.75	1800.00
	40100.000	12512.00	82.25	2.15	.71	2.15	2315.94	1800.00
	40100.000	15660.00	83.13	.88	.69	3.03	2646.48	1800.00
	40100.000	26100.00	85.72	2.60	.76	5.63	3536.26	1800.00
	41090.000	6816.00	81.86	.00	.36	.00	534.11	990.00
	41090.000	12512.00	83.28	2.22	.43	2.22	1895.68	990.00
	41090.000	15660.00	84.18	.90	.45	3.12	4845.79	990.00
	41090.000	26100.00	86.21	2.04	.49	5.15	6401.58	990.00
	44420.000	6816.00	82.09	.00	1.83	.00	1403.41	3330.00
	44420.000	12512.00	84.63	2.54	1.35	2.54	1576.98	3330.00
	44420.000	15660.00	85.56	.93	1.39	3.47	6645.03	3330.00
	44420.000	26100.00	87.41	1.85	1.70	5.32	8797.98	3330.00
	47720.000	6816.00	83.21	.00	1.12	.00	922.56	3300.00
	47720.000	12512.00	85.67	2.46	1.08	2.46	6789.43	3300.00
	47720.000	15660.00	86.51	.84	.93	3.30	8851.19	3300.00
	47720.000	26100.00	88.21	1.71	.83	5.05	9124.42	3300.00

	56220.000	6480.00	87.87	.00	3.86	.00	2531.31	6500.00
	56220.000	11960.00	88.99	1.91	3.31	1.91	2687.50	6500.00
	56220.000	15030.00	89.61	.62	3.89	2.52	2737.00	6500.00
	56220.000	25056.00	91.24	1.66	3.00	4.19	3865.18	6500.00
*	56700.000	6480.00	88.95	.00	1.87	.00	433.16	3480.00
*	56700.000	11960.00	90.38	1.76	1.72	1.76	648.82	3480.00
*	56700.000	15030.00	91.48	.78	1.88	2.54	747.59	3480.00
*	56700.000	25056.00	93.49	2.00	2.22	4.54	965.80	3480.00
	60430.000	6480.00	89.88	.00	.93	.00	370.34	730.00
	60430.000	11960.00	92.30	2.42	1.60	2.42	1022.87	730.00
	60430.000	15030.00	93.37	1.06	1.88	3.49	1167.69	730.00
	60430.000	25056.00	95.85	2.49	2.37	5.97	1296.63	730.00
	60685.000	6480.00	88.26	.00	.38	.00	160.09	255.00
	60685.000	11960.00	92.97	2.70	.66	2.70	216.00	255.00
	60685.000	15030.00	94.05	1.08	.69	3.79	216.00	255.00
*	60685.000	25056.00	97.32	3.27	1.47	7.06	1579.77	255.00
	60715.000	6480.00	90.30	.00	.04	.00	160.17	30.00
	60715.000	11960.00	93.03	2.73	.07	2.73	216.00	30.00
	60715.000	15030.00	94.14	1.10	.08	3.84	216.00	30.00
	60715.000	25056.00	98.52	4.39	1.20	8.22	1633.51	30.00
	60864.000	6480.00	90.45	.00	.16	.00	420.76	249.00
	60864.000	11960.00	93.39	2.93	.35	2.93	1104.88	249.00
	60864.000	15030.00	94.64	1.26	.51	4.19	1210.83	249.00
	60864.000	25056.00	98.47	3.83	-.05	8.02	1465.92	249.00
	61564.000	6480.00	90.99	.00	.54	.00	868.27	600.00
	61564.000	11960.00	94.13	3.14	.74	3.14	1401.61	600.00
*	61564.000	15030.00	95.42	1.29	.77	4.43	1578.26	600.00
*	61564.000	25056.00	99.14	3.72	.67	8.15	1831.57	600.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	88410.000	6480.00	93.25	.00	2.26	.00	782.82	6846.00
*	88410.000	11960.00	96.51	3.26	2.38	3.26	1598.91	6846.00
	88410.000	15030.00	97.80	1.29	2.39	4.55	1870.34	6846.00
	88410.000	25056.00	101.21	3.41	2.07	7.96	2950.90	6846.00
	92720.000	6480.00	95.49	.00	2.24	.00	5049.29	14310.00
*	92720.000	11960.00	98.17	2.68	1.66	2.68	5316.70	14310.00
*	92720.000	15030.00	99.33	1.16	1.53	3.84	5433.65	14310.00
*	92720.000	25056.00	102.47	3.14	1.26	6.98	5796.51	14310.00
*	92880.000	6480.00	97.27	.00	1.78	.00	5907.98	10080.00
*	92880.000	11960.00	99.14	1.87	.97	1.87	6413.84	10080.00
*	92880.000	15030.00	100.12	.99	.78	2.85	6516.40	10080.00
	92880.000	25056.00	103.01	2.89	.54	5.74	6774.80	10080.00
*	93680.000	6480.00	97.48	.00	.22	.00	2149.73	800.00
*	93680.000	11960.00	99.29	1.80	.15	1.80	4224.99	800.00
*	93680.000	15030.00	100.26	.97	.14	2.77	5020.52	800.00
*	93680.000	25056.00	103.10	2.84	.09	5.61	5247.96	800.00
*	93755.000	6480.00	97.76	.00	.27	.00	178.00	155.00
*	93755.000	11960.00	99.44	1.67	.15	1.67	4822.48	155.00
*	93755.000	15030.00	100.33	.89	.07	2.56	5529.78	155.00
	93755.000	25056.00	103.12	2.79	.02	5.36	5571.99	155.00
	93785.000	6480.00	97.82	.00	.06	.00	178.00	30.00
	93785.000	11960.00	99.47	1.66	.03	1.66	4710.28	30.00
	93785.000	15030.00	100.32	.86	.00	2.52	5529.93	30.00
	93785.000	25056.00	103.12	2.79	.00	5.31	5571.94	30.00
*	93950.000	6480.00	97.83	.00	.02	.00	2685.21	165.00
*	93950.000	11960.00	99.53	1.71	.07	1.71	4471.73	165.00
*	93950.000	15030.00	100.40	.86	.07	2.57	5031.65	165.00
	93950.000	25056.00	103.17	2.77	.05	5.34	5253.60	165.00
	94410.000	6480.00	98.28	.00	.45	.00	3152.38	460.00
	94410.000	11960.00	99.89	1.61	.36	1.61	4866.11	460.00
	94410.000	15030.00	100.67	.78	.27	2.39	5052.32	460.00
	94410.000	25056.00	103.29	2.62	.12	5.01	5263.18	460.00
	110700.000	6480.00	101.89	.00	5.81	.00	5426.25	16290.00
	110700.000	11960.00	105.00	3.12	5.31	3.12	5958.59	16290.00
	110700.000	15030.00	105.48	.48	4.74	3.52	6022.63	16290.00
	110700.000	25056.00	106.55	1.15	3.26	2.67	7800.05	16290.00
	113850.000	6480.00	104.65	.00	.76	.00	1778.78	3150.00
	113850.000	11960.00	106.01	1.36	1.01	1.36	2546.49	3150.00
	113850.000	15030.00	106.54	.53	1.14	1.90	2794.71	3150.00
	113850.000	25056.00	107.92	1.38	1.27	3.28	3435.37	3150.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	116530.000	6480.00	101.69	.00	1.04	.00	936.93	4680.00
	116530.000	11960.00	103.80	2.11	1.19	2.11	1115.09	4680.00
	116530.000	15030.00	104.68	.89	2.14	2.99	1173.83	4680.00
	116530.000	25056.00	110.88	2.20	2.96	5.20	2471.66	4680.00
	121500.000	6480.00	104.51	.00	.81	.00	370.76	2970.00
	121500.000	11960.00	109.19	2.62	1.39	2.62	436.29	2970.00
	121500.000	15030.00	110.30	1.11	1.61	3.73	450.22	2970.00
	121500.000	25056.00	112.98	2.68	2.09	6.41	488.20	2970.00
	123580.000	6480.00	107.21	.00	.78	.00	315.17	2080.00
	123580.000	11960.00	110.30	3.09	1.11	3.09	360.39	2080.00
	123580.000	15030.00	111.61	1.31	1.31	4.34	385.22	2080.00
	123580.000	25056.00	114.89	3.29	1.91	7.61	451.47	2080.00
	123659.000	6480.00	107.30	.00	.03	.00	315.55	79.00
	123659.000	11960.00	110.34	3.05	.04	3.05	361.02	79.00
	123659.000	15030.00	111.66	1.31	.05	4.36	386.22	79.00
	123659.000	25056.00	114.97	3.31	.07	7.67	455.33	79.00
*	123660.000	6480.00	109.51	.00	2.21	.00	456.66	1.00
*	123660.000	11960.00	110.74	1.24	.40	1.24	494.42	1.00
*	123660.000	15030.00	111.36	.62	-.29	1.86	509.75	1.00
	123660.000	25056.00	113.92	2.56	-1.05	4.41	584.04	1.00
	123661.000	6480.00	109.51	.00	.01	.00	456.67	1.00
	123661.000	11960.00	110.76	1.24	.01	1.24	494.61	1.00
	123661.000	15030.00	111.37	.61	.00	1.86	509.81	1.00
	123661.000	25056.00	113.92	2.55	.00	4.41	583.93	1.00
*	123662.000	6480.00	110.69	.00	1.18	.00	367.85	1.00
*	123662.000	11960.00	112.37	1.68	1.61	1.68	403.99	1.00
	123662.000	15030.00	113.15	.78	1.79	2.46	420.94	1.00
	123662.000	25056.00	115.41	2.25	1.49	4.71	469.68	1.00
	123663.000	6480.00	110.69	.00	.00	.00	367.76	1.00
	123663.000	11960.00	112.37	1.68	.00	1.68	404.03	1.00
	123663.000	15030.00	113.15	.78	.00	2.46	420.99	1.00
	123663.000	25056.00	115.41	2.25	.00	4.72	469.74	1.00
	123665.000	6480.00	110.69	.00	.00	.00	367.76	2.00
	123665.000	11960.00	112.37	1.68	.00	1.68	404.07	2.00
	123665.000	15030.00	113.16	.79	.00	2.46	421.04	2.00
	123665.000	25056.00	115.41	2.26	.01	4.72	469.86	2.00
	123670.000	6480.00	110.78	.00	.00	.00	367.82	5.00
	123670.000	11960.00	112.38	1.60	.01	1.68	404.20	5.00
	123670.000	15030.00	113.17	.79	.01	2.47	421.23	5.00
	123670.000	25056.00	115.43	2.26	.01	4.72	470.14	5.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	123680.000	6480.00	110.78	.00	.01	.00	367.95	10.00
	123680.000	11960.00	112.39	1.69	.01	1.69	404.47	10.00
	123680.000	15030.00	113.18	.79	.02	2.48	421.57	10.00
	123680.000	25056.00	115.46	2.27	.03	4.75	470.69	10.00
	123720.000	6480.00	110.73	.00	.02	.00	368.45	40.00
	123720.000	11568.00	112.44	1.72	.05	1.72	405.51	40.00
	123720.000	15030.00	113.25	.81	.07	2.52	422.89	40.00
	123720.000	25056.00	115.57	2.32	.11	4.84	472.97	40.00
	123770.000	6480.00	110.74	.00	.01	.00	218.10	50.00
	123770.000	11960.00	112.49	1.75	.04	1.75	349.10	50.00
	123770.000	15030.00	113.30	.82	.06	2.56	382.52	50.00
	123770.000	25056.00	115.66	2.35	.09	4.92	451.96	50.00
	123790.000	6480.00	110.76	.00	.02	.00	218.22	20.00
	123790.000	11960.00	113.40	2.64	.91	2.64	226.00	20.00
	123790.000	15030.00	114.49	1.10	1.19	3.74	426.97	20.00
	123790.000	25056.00	116.81	2.32	1.15	6.06	476.83	20.00
	123940.000	6480.00	110.90	.00	.15	.00	372.11	150.00
	123940.000	11960.00	113.65	2.75	.26	2.75	431.61	150.00
	123940.000	15030.00	114.72	1.07	.23	3.82	454.88	150.00
	123940.000	25056.00	117.16	2.44	.35	6.26	507.71	150.00
	125600.000	6480.00	112.02	.00	1.12	.00	308.76	1660.00
	125600.000	11960.00	115.25	3.23	1.59	3.23	427.97	1660.00
	125600.000	15030.00	116.58	1.33	1.86	4.56	470.52	1660.00
	125600.000	25056.00	119.96	3.39	2.70	7.94	575.65	1660.00
	127500.000	6480.00	114.08	.00	2.07	.00	451.72	1900.00
	127500.000	11960.00	117.73	3.64	2.48	3.64	530.06	1900.00
	127500.000	15030.00	119.26	1.53	2.69	5.17	562.67	1900.00
	127500.000	25056.00	123.09	3.83	3.23	9.00	642.01	1900.00
	128430.000	6480.00	114.90	.00	.82	.00	234.53	930.00
	128430.000	11960.00	119.59	3.69	.86	3.69	277.62	930.00
	128430.000	15030.00	120.14	1.55	.89	5.24	291.41	930.00
	128430.000	25056.00	124.02	3.87	.93	9.11	325.89	930.00
	130250.000	6480.00	116.28	.00	1.39	.00	260.32	1820.00
	130250.000	11960.00	120.47	4.19	1.83	4.19	308.55	1820.00
	130250.000	15030.00	122.18	1.72	2.05	5.90	356.70	1820.00
	130250.000	25056.00	126.71	4.53	2.69	10.42	1027.07	1820.00
	130560.000	6480.00	116.80	.00	.31	.00	288.57	310.00
	130560.000	11960.00	121.06	4.26	.44	4.26	525.91	310.00
	130560.000	15030.00	122.70	1.64	.51	6.11	581.08	310.00
	130560.000	25056.00	127.25	4.55	.55	10.66	717.60	310.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWSC	TOPWID	XLCH
130860.000	6480.00	116.96	.06	.26	.00	784.81	300.00
* 130860.000	11960.00	121.19	4.31	.33	4.23	937.67	300.00
* 130860.000	15035.00	121.65	1.86	.34	6.19	865.37	300.00
* 130860.000	25556.00	127.65	4.61	.40	10.80	918.53	300.00
* 131760.000	6134.40	117.06	.00	.20	.00	1680.25	900.00
* 131760.000	11316.00	121.37	4.31	.19	4.31	1664.99	900.00
* 131760.000	14220.00	122.24	1.86	.19	6.17	1675.63	900.00
* 131760.000	23838.00	127.87	4.63	.21	10.81	1684.82	900.00
132650.000	6134.40	117.11	.00	.05	.00	1189.50	890.00
132650.000	11316.00	121.42	4.30	.04	4.30	1275.45	890.00
132650.000	14220.00	123.28	1.86	.04	6.16	1271.99	890.00
132650.000	23838.00	127.91	4.63	.05	10.80	1083.26	890.00
* 134650.000	6134.40	117.25	.00	.14	.00	2613.21	2000.00
* 134650.000	11316.00	121.54	4.29	.12	4.29	2195.38	2000.00
* 134650.000	14220.00	123.40	1.86	.12	6.15	2874.49	2000.00
* 134650.000	23838.00	128.04	4.64	.12	10.79	4000.00	2000.00
* 144570.000	5904.00	118.02	.00	.77	.00	2790.33	9920.00
* 144570.000	10948.00	121.97	3.95	.43	3.95	5490.25	9920.00
* 144570.000	13770.00	123.76	1.79	.38	5.74	5752.04	9920.00
144570.000	23316.00	128.31	4.55	.27	10.28	6213.27	9920.00
* 145260.000	5904.00	118.30	.00	.28	.00	2203.17	690.00
* 145260.000	10948.00	122.03	3.73	.06	3.73	3127.38	690.00
* 145260.000	13770.00	123.80	1.76	.04	5.50	3612.99	690.00
* 145260.000	23316.00	128.33	4.53	.02	10.02	4946.93	690.00
145900.000	5904.00	119.35	.00	1.05	.00	1496.63	640.00
145900.000	10948.00	122.29	2.94	.25	2.94	2793.41	640.00
145900.000	13770.00	123.95	1.67	.16	4.60	3305.77	640.00
145900.000	23316.00	128.39	4.44	.07	9.04	3862.98	640.00
147210.000	5904.00	120.55	.00	1.20	.00	2285.92	1310.00
147210.000	10948.00	122.72	2.18	.44	2.18	2546.96	1310.00
147210.000	13770.00	124.20	1.47	.25	3.65	2724.86	1310.00
147210.000	23316.00	128.48	4.28	.09	7.93	3268.27	1310.00
147940.000	5904.00	121.03	.00	.48	.00	1366.09	730.00
147940.000	10948.00	123.06	2.02	.22	2.02	2672.94	730.00
147940.000	13770.00	124.42	1.36	.22	3.38	2349.79	730.00
147940.000	23316.00	128.58	4.16	.10	7.55	3538.16	730.00
* 148165.000	5904.00	121.02	.00	.00	.00	97.79	225.00
148165.000	10948.00	123.24	2.22	.19	2.22	2206.73	225.00
148165.000	13770.00	124.57	1.33	.15	3.55	2199.32	225.00
148165.000	23316.00	128.65	4.08	.07	7.63	3640.93	225.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWSC	TOPWID	XLCH
148195.000	5904.00	121.04	.00	.01	.00	97.80	30.00
* 148195.000	10948.00	123.47	2.43	.22	2.43	100.00	30.00
148195.000	13770.00	125.99	2.52	1.42	4.95	2760.88	30.00
148195.000	23316.00	128.66	2.67	.01	7.62	3643.08	30.00
* 148340.000	5904.00	121.48	.00	.45	.00	1638.56	145.00
* 148340.000	10948.00	124.52	3.04	1.06	3.04	2386.16	145.00
148340.000	13770.00	126.02	1.50	.03	4.54	2467.43	145.00
148340.000	23316.00	128.69	2.67	.03	7.21	2601.19	145.00
160220.000	5904.00	127.77	.00	6.29	.00	417.36	11840.00
* 160220.000	10948.00	130.53	2.76	6.00	2.76	647.71	11840.00
* 160220.000	13770.00	131.44	.91	5.42	3.67	741.55	11840.00
* 160220.000	23316.00	134.55	3.11	5.86	6.78	1213.34	11840.00
165810.000	5904.00	131.60	.00	3.83	.00	815.55	5590.00
165810.000	10948.00	134.79	3.20	4.27	3.20	1851.92	5590.00
* 165810.000	13770.00	135.98	1.19	4.54	4.38	1976.65	5590.00
* 165810.000	23316.00	139.10	3.12	4.55	7.51	2130.83	5590.00
166035.000	5904.00	131.74	.00	.14	.00	210.00	225.00
166035.000	10948.00	134.89	3.14	.09	3.14	1586.08	225.00
166035.000	13770.00	136.06	1.17	.08	4.32	1715.38	225.00
166035.000	23316.00	139.17	3.11	.06	7.42	2044.43	225.00
166865.000	5904.00	131.75	.00	.01	.00	210.00	30.00
166865.000	10948.00	135.08	3.32	.19	3.32	210.00	30.00
166865.000	13770.00	136.68	1.60	.60	4.93	1808.15	30.00
166865.000	23316.00	139.47	2.79	.30	7.72	2053.40	30.00
166265.000	5904.00	131.93	.00	.17	.00	684.88	200.00
166265.000	10948.00	135.43	3.51	.36	3.51	1748.44	200.00
166265.000	13770.00	136.84	1.42	.16	4.92	1964.96	200.00
166265.000	23316.00	139.64	2.81	.13	7.72	2110.65	200.00
169000.000	5904.00	133.79	.00	1.87	.00	473.66	2735.00
169000.000	10948.00	137.20	3.41	1.77	3.41	608.94	2735.00
169000.000	13770.00	138.53	1.33	1.69	4.74	617.43	2735.00
169000.000	23316.00	141.52	2.99	1.81	7.73	908.38	2735.00
170540.000	5904.00	134.47	.00	.68	.00	854.66	1540.00
* 170540.000	10948.00	137.99	3.52	.19	3.52	1210.59	1540.00
* 170540.000	13770.00	139.38	1.40	.86	4.91	1445.10	1540.00
* 170540.000	23316.00	142.64	3.25	1.12	8.16	1812.53	1540.00
174650.000	5904.00	135.77	.00	1.29	.00	850.19	2510.00
174650.000	10948.00	139.21	3.44	1.22	3.44	1719.89	2510.00
174650.000	13770.00	140.59	1.38	1.20	4.83	1719.24	2510.00
174650.000	23316.00	143.92	3.33	1.29	8.16	1732.13	2510.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWSC	TOPWID	XLCH
176130.000	5904.00	136.74	.00	.98	.00	502.26	2080.00
176130.000	10948.00	140.15	3.41	.96	3.41	949.59	2080.00
176130.000	13770.00	141.51	1.35	.93	4.76	1294.82	2080.00
176130.000	23316.00	144.85	3.34	.92	8.10	1587.95	2080.00
* 177470.000	5904.00	137.28	.00	.46	.00	848.65	1340.00
* 177470.000	10948.00	140.72	3.52	.57	3.52	908.25	1340.00
* 177470.000	13770.00	142.12	1.40	.62	4.92	931.54	1340.00
* 177470.000	23316.00	145.53	3.41	.71	8.33	986.44	1340.00
* 177705.000	5904.00	137.20	.00	.00	.00	198.00	235.00
* 177705.000	10948.00	140.67	3.47	-.05	3.47	198.00	235.00
177705.000	13770.00	142.16	1.48	.03	4.95	843.40	235.00
177705.000	23316.00	145.60	3.44	.05	8.40	992.67	235.00
177735.000	5904.00	137.21	.00	.01	.00	198.00	30.00
177735.000	10948.00	140.79	3.58	.12	3.58	198.00	30.00
177735.000	13770.00	142.52	1.73	.37	5.31	846.66	30.00
177735.000	23316.00	145.73	3.20	.13	8.52	994.60	30.00
177912.000	5904.00	137.30	.00	.09	.00	721.15	177.00
177912.000	10948.00	140.98	3.68	.19	3.68	897.65	177.00
* 177912.000	13770.00	142.54	1.56	.02	5.24	933.58	177.00
* 177912.000	23316.00	145.74	3.20	.01	8.44	986.67	177.00
* 180750.000	5904.00	137.71	.00	.42	.00	2149.74	2830.00
* 180750.000	10948.00	141.42	3.70	.43	3.70	2244.36	2830.00
* 180750.000	13770.00	143.00	1.58	.46	5.28	2284.35	2830.00
* 180750.000	23316.00	146.37	3.37	.63	8.65	2378.89	2830.00
* 183479.000	5904.00	138.04	.00	.33	.00	1282.94	2729.00
* 183479.000	10948.00	141.71	3.67	.30	3.67	2077.80	2729.00
* 183479.000	13770.00	143.28	1.57	.28	5.24	2207.56	2729.00
* 183479.000	23316.00	146.69	3.41	.33	8.65	2460.18	2729.00
183529.000	5904.00	138.10	.00	.06	.00	1313.65	50.00
183529.000	10948.00	141.73	3.64	.02	3.64	2078.19	50.00
183529.000	13770.00	143.28	1.56	.02	5.20	2208.45	50.00
183529.000	23316.00	146.71	3.41	.01	8.61	2460.77	50.00
183530.000	5904.00	138.10	.00	.01	.00	1317.09	1.00
183530.000	10948.00	141.75	3.64	.01	3.64	2078.73	1.00
183530.000	13770.00	143.30	1.56	.01	5.20	2209.14	1.00
183530.000	23316.00	146.71	3.41	.00	8.61	2461.33	1.00
183532.000	5904.00	138.11	.00	.00	.00	1321.88	2.00
183532.000	10948.00	141.75	3.64	.00	3.64	2078.96	2.00
183532.000	13770.00	143.31	1.56	.00	5.20	2209.90	2.00
183532.000	23316.00	146.71	3.41	.00	8.60	2461.43	2.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWSC	TOPWID	XLCH
183533.000	5904.00	138.10	.00	.00	.00	1320.45	1.00
183533.000	10948.00	141.74	3.64	-.01	3.64	2078.98	1.00
183533.000	13770.00	143.30	1.56	.00	5.20	2209.85	1.00
183533.000	23316.00	146.71	3.41	.00	8.60	2461.45	1.00
183534.000	5904.00	138.11	.00	.00	.00	1318.87	1.00
183534.000	10948.00	141.74	3.64	.00	3.64	2078.77	1.00
183534.000	13770.00	143.30	1.56	.00	5.20	2209.56	1.00
183534.000	23316.00	146.71	3.41	.00	8.60	2461.31	1.00
183535.000	5904.00	138.11	.00	.00	.00	1319.22	1.00
183535.000	10948.00	141.74	3.63	.00	3.63	2078.78	1.00
183535.000	13770.00	143.30	1.56	.00	5.20	2209.58	1.00
183535.000	23316.00	146.71	3.41	.00	8.60	2461.33	1.00
183537.000	5904.00	138.11	.00	.00	.00	1320.35	2.00
183537.000	10948.00	141.74	3.63	.00	3.63	2078.81	2.00
183537.000	13770.00	143.30	1.56	.00	5.19	2209.64	2.00
183537.000	23316.00	146.71	3.41	.00	8.60	2461.36	2.00
183540.000	5904.00	138.11	.00	.00	.00	1322.10	3.00
183540.000	10948.00	141.74	3.63	.00	3.63	2078.85	3.00
183540.000	13770.00	143.30	1.56	.00	5.19	2209.74	3.00
183540.000	23316.00	146.71	3.41	.00	8.60	2461.42	3.00
183545.000	5904.00	138.12	.00	.01	.00	1325.00	5.00
183545.000	10948.00	141.75	3.63	.00	3.63	2078.93	5.00
183545.000	13770.00	143.31	1.56	.00	5.19	2209.89	5.00
183545.000	23316.00	146.71	3.41	.00	8.60	2461.51	5.00
183555.000	5904.00	138.13	.00	.01	.00	1330.72	10.00
183555.000	10948.00	141.75	3.62	.00	3.62	2079.01	10.00
183555.000	13770.00	143.31	1.56	.00	5.18	2210.21	10.00
183555.000	23316.00	146.72	3.41	.00	8.59	2461.70	10.00
183575.000	5904.00	138.15	.00	.02	.00	1342.69	20.00
183575.000	10948.00	141.78	3.63	.01	3.63	2079.21	20.00
183575.000	13770.00	143.32	1.56	.01	5.19	2210.83	20.00

183575.000	23316.00	146.72	3.41	.01	8.57	2462.87	20.00
183650.000	5904.00	134.42	.00	.23	.00	1490.13	275.00
183650.000	10948.00	141.88	3.46	.12	3.46	2082.35	275.00
183650.000	13770.00	143.41	1.53	.09	4.98	2219.32	275.00
183650.000	23316.00	146.80	3.39	.09	8.37	2467.15	275.00
* 184810.000	5904.00	136.88	.00	.46	.00	801.83	960.00
184810.000	10948.00	142.17	5.29	.30	5.29	930.07	960.00
184810.000	13770.00	143.66	1.49	.24	6.78	847.83	960.00
184810.000	23316.00	147.63	3.97	.24	8.15	871.77	960.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
185105.000	5904.00	138.93	.00	.05	.00	500.00	295.00
185105.000	10948.00	142.22	3.29	.05	3.29	500.00	295.00
185105.000	13770.00	143.71	1.49	.04	4.78	500.00	295.00
185105.000	23316.00	147.07	3.36	.03	8.14	500.00	295.00
185255.000	5904.00	138.88	.00	.05	.00	236.00	150.00
185255.000	10948.00	142.26	3.29	.04	3.29	236.00	150.00
185255.000	13770.00	143.74	1.48	.03	4.76	236.00	150.00
185255.000	23316.00	147.07	3.33	.00	8.09	236.00	150.00
185345.000	5904.00	138.98	.00	.01	.00	236.00	90.00
185345.000	10948.00	142.27	3.29	.01	3.29	236.00	90.00
185345.000	13770.00	143.76	1.48	.02	4.77	236.00	90.00
185345.000	23316.00	147.10	3.34	.03	8.12	236.00	90.00
185495.000	5904.00	139.06	.00	.08	.00	500.00	150.00
185495.000	10948.00	142.42	3.36	.15	3.36	500.00	150.00
185495.000	13770.00	143.94	1.52	.19	4.88	500.00	150.00
185495.000	23316.00	147.45	3.50	.35	8.38	500.00	150.00
185770.000	5904.00	139.15	.00	.08	.00	1201.36	275.00
* 185770.000	10948.00	142.56	3.41	.13	3.41	1424.33	275.00
* 185770.000	13770.00	144.10	1.55	.16	4.96	1565.33	275.00
* 185770.000	23316.00	147.72	3.61	.27	8.57	1542.50	275.00
187630.000	5904.00	139.39	.00	.24	.00	1893.67	1860.00
187630.000	10948.00	142.82	3.44	.27	3.44	1269.09	1860.00
187630.000	13770.00	144.38	1.55	.28	4.99	1365.27	1860.00
187630.000	23316.00	148.05	3.67	.33	8.66	1644.93	1860.00
188770.000	5904.00	139.55	.00	.16	.00	1438.89	1140.00
188770.000	10948.00	143.00	3.45	.17	3.45	1841.69	1140.00
188770.000	13770.00	144.56	1.56	.18	5.01	1957.78	1140.00
188770.000	23316.00	148.26	3.70	.21	8.71	1884.72	1140.00
189700.000	5904.00	139.66	.00	.12	.00	1235.85	930.00
* 189700.000	10948.00	143.12	3.46	.12	3.46	1266.07	930.00
* 189700.000	13770.00	144.68	1.56	.13	5.02	1279.07	930.00
* 189700.000	23316.00	148.41	3.73	.15	8.75	1218.14	930.00
* 190174.000	5904.00	139.72	.00	.08	.00	220.00	474.00
* 190174.000	10948.00	143.11	3.39	-.01	3.39	220.00	474.00
* 190174.000	13770.00	144.62	1.51	-.06	4.90	220.00	474.00
* 190174.000	23316.00	148.15	3.53	-.26	8.43	220.00	474.00
190364.000	5904.00	139.78	.00	.07	.00	140.00	190.00
190364.000	10948.00	143.12	3.33	.01	3.33	140.00	190.00
190364.000	13770.00	144.58	1.46	-.05	4.79	140.00	190.00
190364.000	23316.00	147.94	3.27	-.30	8.06	140.00	190.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
190464.000	5904.00	140.00	.00	.21	.00	94.00	100.00
190464.000	10948.00	143.48	3.48	.36	3.48	94.00	100.00
190464.000	13770.00	145.03	1.54	.45	5.03	94.00	100.00
* 190464.000	23316.00	150.31	5.28	2.47	10.31	2810.19	100.00
190496.000	5904.00	140.00	.00	.00	.00	94.00	32.00
190496.000	10948.00	143.48	3.49	.00	3.49	94.00	32.00
190496.000	13770.00	145.25	1.76	.22	5.25	94.00	32.00
190496.000	23316.00	150.46	5.22	.15	10.47	2816.09	32.00
* 190550.000	5904.00	140.13	.00	.13	.00	117.00	54.00
* 190550.000	10948.00	143.77	3.64	.29	3.64	117.00	54.00
* 190550.000	13770.00	145.62	1.85	.31	5.49	117.00	54.00
190550.000	23316.00	150.39	4.77	-.07	10.27	2745.02	54.00
190604.000	5904.00	140.26	.00	.13	.00	167.00	54.00
190604.000	10948.00	144.04	3.79	.27	3.79	167.00	54.00
190604.000	13770.00	145.97	1.93	.35	5.72	167.00	54.00
190604.000	23316.00	150.41	4.44	.02	10.15	2767.77	54.00
190636.000	5904.00	140.27	.00	.01	.00	167.00	32.00
190636.000	10948.00	144.07	3.80	.03	3.80	167.00	32.00
190636.000	13770.00	146.01	1.94	.03	5.74	167.00	32.00
190636.000	23316.00	150.44	4.43	.03	10.17	2788.77	32.00
190820.000	5904.00	140.42	.00	.15	.00	534.00	184.00
190820.000	10948.00	144.32	3.90	.25	3.90	534.00	184.00
190820.000	13770.00	146.21	1.88	.28	5.78	534.00	184.00
190820.000	23316.00	150.61	4.40	.19	10.19	2783.78	184.00
190920.000	5904.00	140.58	.00	.16	.00	700.00	100.00
* 190920.000	10948.00	144.53	3.97	.22	3.97	700.00	100.00
* 190920.000	13770.00	146.54	2.01	.24	5.98	700.00	100.00
190920.000	23316.00	150.70	4.16	.09	10.14	2680.75	100.00
* 191500.000	5904.00	140.71	.00	.13	.00	1399.81	580.00
* 191500.000	10948.00	144.70	3.99	.17	3.99	1400.00	580.00
* 191500.000	13770.00	146.72	2.02	.17	6.01	1400.00	580.00
* 191500.000	23316.00	150.79	4.07	.09	10.08	2676.42	580.00
* 193640.000	5395.20	141.10	.00	.39	.00	1460.81	2340.00
193640.000	10120.00	145.01	3.91	.31	3.91	2791.47	2340.00
193640.000	12870.00	146.99	1.98	.27	5.88	2882.62	2340.00
* 193640.000	21837.00	150.97	3.98	.18	9.87	3832.10	2340.00
195378.000	5395.20	141.46	.00	.36	.00	1051.88	1530.00
195378.000	10120.00	145.25	3.78	.24	3.78	2284.65	1530.00
195378.000	12870.00	147.17	1.92	.18	5.70	2504.47	1530.00
195378.000	21837.00	151.12	3.95	.15	9.66	3089.86	1530.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
* 195504.000	5395.20	141.42	.00	-.05	.00	148.00	126.00
195504.000	10120.00	145.26	3.85	.01	3.85	2023.95	126.00
195504.000	12870.00	147.18	1.92	.01	5.76	2188.80	126.00
195504.000	21837.00	151.13	3.95	.01	9.72	3090.33	126.00
195536.000	5395.20	141.43	.00	.01	.00	148.00	32.00
195536.000	10120.00	145.49	4.06	.22	4.06	2027.50	32.00
195536.000	12870.00	147.19	1.71	.01	5.76	2139.98	32.00
195536.000	21837.00	151.13	3.94	.00	9.70	3086.92	32.00
* 195770.000	5395.20	141.67	.00	.24	.00	1025.07	234.00
195770.000	10120.00	145.54	3.87	.05	3.87	2444.66	234.00
195770.000	12870.00	147.24	1.70	.05	5.57	2575.87	234.00
195770.000	21837.00	151.16	3.92	.03	9.49	3069.22	234.00
199970.000	5395.20	142.65	.00	1.19	.00	857.84	4200.00
199970.000	10120.00	146.44	3.79	.91	3.79	2030.32	4200.00
199970.000	12870.00	148.00	1.56	.76	5.35	2271.19	4200.00
199970.000	21837.00	151.75	3.75	.59	8.90	2859.22	4200.00
* 209660.000	5395.20	143.82	.00	.96	.00	2942.28	9690.00
* 209660.000	10120.00	147.06	3.24	.62	3.24	3056.93	9690.00
* 209660.000	12870.00	148.53	1.47	.53	4.72	3104.66	9690.00
* 209660.000	21837.00	152.19	3.66	.44	8.38	3234.98	9690.00
* 210600.000	5395.20	143.74	.00	-.08	.00	746.87	940.00
* 210600.000	10120.00	147.08	3.32	.08	3.32	1096.97	940.00
* 210600.000	12870.00	148.58	1.50	.02	4.82	1419.35	940.00
* 210600.000	21837.00	152.26	3.70	.03	8.52	2059.65	940.00
211350.000	5395.20	145.58	.00	1.84	.00	727.01	750.00
211350.000	10120.00	148.20	2.62	1.15	2.62	1291.00	750.00
211350.000	12870.00	149.48	1.27	.92	3.89	1398.28	750.00
211350.000	21837.00	152.81	3.33	.55	7.23	1721.74	750.00
* 211500.000	5395.20	146.08	.00	.50	.00	539.20	150.00
211500.000	10120.00	148.41	2.33	.20	2.33	688.03	150.00
211500.000	12870.00	149.56	1.15	.09	3.48	761.84	150.00
211500.000	21837.00	152.75	3.19	-.06	6.67	912.07	150.00
211626.000	5395.20	146.38	.00	.30	.00	159.00	126.00
211626.000	10120.00	148.71	2.33	.30	2.33	159.00	126.00
211626.000	12870.00	150.06	1.35	.50	3.68	796.80	126.00
211626.000	21837.00	153.19	3.13	.44	6.81	933.27	126.00
211654.000	5395.20	146.40	.00	.02	.00	159.00	28.00
211654.000	10120.00	149.23	2.83	.12	2.83	159.00	28.00
211654.000	12870.00	151.12	1.89	1.06	4.72	838.25	28.00
211654.000	21837.00	153.50	2.38	.31	7.20	948.12	28.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
211880.000	5395.20	146.53	.00	.13	.00	568.01	226.00
211880.000	10120.00	149.54	3.01	.32	3.01	760.86	226.00
211880.000	12870.00	151.22	1.67	.09	4.69	840.29	226.00
211880.000	21837.00	153.66	2.44	.16	7.13	855.68	226.00
* 214360.000	5395.20	147.62	.00	1.09	.00	954.16	2480.00
* 214360.000	10120.00	150.84	3.22	1.20	3.22	1063.97	2480.00
* 214360.000	12870.00	152.47	1.63	1.25	4.85	1147.05	2480.00
* 214360.000	21837.00	155.37	2.90	1.71	7.75	1359.58	2480.00
216920.000	5395.20	147.97	.00	.35	.00	3056.65	2560.00
* 216920.000	10120.00	151.17	3.20	.33	3.20	3359.88	2560.00
* 216920.000	12870.00	152.76	1.61	.31	4.81	3523.66	2560.00
* 216920.000	21837.00	155.76	2.98	.39	7.79	3652.24	2560.00
217120.000	5395.20	147.99	.00	.02	.00	3243.38	200.00
217120.000	10120.00	151.18	3.19	.01	3.19	3675.13	200.00
217120.000	12870.00	152.79	1.61	.01	4.80	3871.67	200.00
217120.000	21837.00	155.77	2.98	.01	7.78	4183.96	200.00
217390.000	5395.20	148.05	.00	.06	.00	3290.58	270.00
217390.000	10120.00	151.21	3.16	.03	3.16	3677.40	270.00

217380.000	12870.00	152.61	1.00	.02	4.77	3833.26	270.00
217380.000	21837.00	155.80	2.98	.02	7.75	4185.59	270.00
217410.000	5395.20	148.05	.00	.00	.00	3292.31	20.00
217410.000	10120.00	151.21	3.16	.00	3.16	3679.06	20.00
217410.000	12870.00	152.61	1.40	.00	4.77	3874.77	20.00
217410.000	21837.00	155.80	2.98	.00	7.75	4186.69	20.00
217626.000	5395.20	148.09	.00	.25	.00	3297.31	226.00
217626.000	10120.00	151.24	3.14	.02	3.16	3681.03	226.00
217626.000	12870.00	152.93	1.69	.02	4.74	3876.01	226.00
217626.000	21837.00	155.82	2.89	.02	7.72	4187.36	226.00
* 220520.000	5395.20	148.94	.00	.85	.00	876.81	2884.00
* 220520.000	10120.00	151.76	2.82	.53	2.82	1002.01	2884.00
* 220520.000	12870.00	153.26	1.50	.43	4.32	1094.20	2884.00
* 220520.000	21837.00	156.25	2.98	.43	7.30	2856.42	2884.00
222812.000	5395.20	150.40	.00	1.45	.00	919.84	2292.00
222812.000	10120.00	153.21	2.81	1.45	2.81	1022.67	2292.00
222812.000	12870.00	154.67	1.41	1.36	4.23	1049.28	2292.00
222812.000	21837.00	157.36	2.72	1.11	6.96	2150.93	2292.00
223312.000	5395.20	150.80	.00	.48	.00	539.79	500.00
223312.000	10120.00	153.58	2.79	.37	2.79	629.10	500.00
223312.000	12870.00	154.97	1.38	.34	4.17	655.47	500.00
223312.000	21837.00	157.56	2.60	.21	6.77	2158.67	500.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
223445.000	5395.20	150.92	.00	.13	.00	152.17	133.00
223445.000	10120.00	153.65	2.72	.06	2.72	156.56	133.00
* 223445.000	12870.00	155.31	1.67	.34	4.39	2598.02	133.00
* 223445.000	21837.00	157.64	2.33	.08	6.72	2703.67	133.00
223475.000	5395.20	150.94	.00	.01	.00	152.21	30.00
223475.000	10120.00	153.67	2.74	.03	2.74	156.63	30.00
* 223475.000	12870.00	156.51	2.84	1.20	5.57	161.21	30.00
223475.000	21837.00	158.70	2.19	1.06	7.75	2742.66	30.00
223620.000	5395.20	151.07	.00	.13	.00	381.38	145.00
223620.000	10120.00	153.98	2.92	.31	2.92	386.10	145.00
223620.000	12870.00	156.85	2.86	.34	5.78	390.72	145.00
223620.000	21837.00	158.72	1.87	.01	7.65	2745.71	145.00
* 224000.000	5395.20	151.35	.00	.29	.00	1031.84	380.00
* 224000.000	10120.00	154.41	3.05	.42	3.05	1036.79	380.00
* 224000.000	12870.00	157.21	2.80	.36	5.86	1045.29	380.00
224000.000	21837.00	158.76	1.55	.04	7.40	2747.07	380.00
229080.000	5395.20	152.75	.00	1.40	.00	2160.69	5080.00
229080.000	10120.00	155.57	2.82	1.17	2.82	3118.68	5080.00
229080.000	12870.00	157.92	2.35	.71	5.17	3596.75	5080.00
* 229080.000	21837.00	159.36	1.43	.65	6.60	3724.84	5080.00
234920.000	5395.20	155.01	.00	2.27	.00	1306.61	5840.00
234920.000	10120.00	157.35	2.32	1.77	2.32	1412.98	5840.00
* 234920.000	12870.00	159.00	1.66	1.08	3.98	1488.79	5840.00
* 234920.000	21837.00	161.02	2.02	1.67	5.99	1560.80	5840.00
235026.000	5395.20	155.08	.00	.05	.00	1207.97	106.00
235026.000	10120.00	157.39	2.32	.05	2.32	1278.27	106.00
235026.000	12870.00	159.04	1.65	.04	3.97	1490.33	106.00
235026.000	21837.00	161.08	2.03	.05	6.00	1582.04	106.00
235054.000	5395.20	156.07	.00	.99	.00	1238.41	28.00
235054.000	10120.00	158.18	2.11	.79	2.11	1302.54	28.00
235054.000	12870.00	159.25	1.07	.21	3.18	1334.72	28.00
* 235054.000	21837.00	161.16	1.91	.08	5.09	1581.16	28.00
235156.000	5395.20	156.09	.00	.02	.00	1255.97	102.00
235156.000	10120.00	158.22	2.13	.04	2.13	1459.03	102.00
235156.000	12870.00	159.29	1.07	.04	3.20	1501.58	102.00
235156.000	21837.00	161.21	1.92	.05	5.12	1589.36	102.00
* 237560.000	5395.20	156.98	.00	.08	.00	1388.49	2404.00
* 237560.000	10120.00	159.31	2.34	1.09	2.34	1629.08	2404.00
* 237560.000	12870.00	160.41	1.09	1.11	3.43	1656.39	2404.00
* 237560.000	21837.00	162.69	2.28	1.47	5.70	1750.27	2404.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
* 240010.000	5395.20	158.93	.00	1.95	.00	1977.80	2450.00
* 240010.000	10120.00	160.99	2.06	1.67	2.06	2055.26	2450.00
* 240010.000	12870.00	161.98	.99	1.57	3.05	2151.96	2450.00
* 240010.000	21837.00	164.34	2.37	1.66	5.42	2269.50	2450.00
242510.000	5395.20	159.86	.00	.93	.00	1971.22	2500.00
242510.000	10120.00	161.93	2.07	.94	2.07	2091.94	2500.00
242510.000	12870.00	162.92	.99	.94	3.06	2148.25	2500.00
242510.000	21837.00	165.37	2.45	1.03	5.51	3270.38	2500.00
* 243920.000	5395.20	160.10	.00	.24	.00	1911.10	1410.00
* 243920.000	10120.00	162.23	2.13	.20	2.13	2238.48	1410.00
* 243920.000	12870.00	163.24	1.01	.12	3.14	2428.43	1410.00
* 243920.000	21837.00	165.75	2.51	.18	5.65	1957.01	1410.00

245070.000	5395.20	160.18	.00	.08	.00	2803.10	1150.00
245070.000	10120.00	162.35	2.17	.12	2.17	2843.49	1150.00
245070.000	12870.00	163.37	1.02	.13	5.18	2853.73	1150.00
245070.000	21837.00	165.91	2.54	.17	5.73	2879.14	1150.00
* 246700.000	5395.20	160.23	.00	.05	.00	2150.21	1630.00
* 246700.000	10120.00	162.60	2.37	.25	2.37	2482.53	1630.00
* 246700.000	12870.00	163.65	1.05	.28	5.42	2495.67	1630.00
* 246700.000	21837.00	166.25	2.59	.33	6.01	2544.92	1630.00
* 248150.000	5395.20	162.63	.00	2.39	.00	1278.42	1450.00
248150.000	10120.00	164.25	1.62	1.65	1.62	1241.76	1450.00
248150.000	12870.00	165.09	.84	1.44	2.47	1383.79	1450.00
248150.000	21837.00	167.43	2.34	1.19	4.81	1493.58	1450.00
249830.000	5395.20	164.31	.00	1.68	.00	1617.54	1680.00
249830.000	10120.00	166.13	1.82	1.68	1.82	1673.04	1680.00
249830.000	12870.00	166.99	.86	1.90	2.68	1698.25	1680.00
249830.000	21837.00	169.33	2.34	1.90	5.02	1831.79	1680.00
* 251060.000	5395.20	165.89	.00	.79	.00	1841.93	1230.00
* 251060.000	10120.00	166.85	1.85	.81	1.85	1951.10	1230.00
* 251060.000	12870.00	167.82	.88	.82	2.73	2007.66	1230.00
* 251060.000	21837.00	170.19	2.37	.86	5.10	2141.98	1230.00
251227.000	5395.20	165.15	.00	.85	.00	1728.81	167.00
251227.000	10120.00	167.01	1.86	.06	1.86	1955.09	167.00
251227.000	12870.00	167.88	.88	.07	2.74	2006.86	167.00
251227.000	21837.00	170.26	2.37	.07	5.12	2146.41	167.00
251253.000	5395.20	165.65	.00	.51	.00	1755.09	26.00
251253.000	10120.00	167.17	1.51	.16	1.51	1964.24	26.00
251253.000	12870.00	167.96	.80	.07	2.31	2011.04	26.00
* 251253.000	21837.00	170.26	2.30	.00	4.61	2146.41	26.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
251360.000	5395.20	165.68	.00	.03	.00	1876.88	107.00
251360.000	10120.00	167.20	1.52	.04	1.52	1966.29	107.00
251360.000	12870.00	168.00	.80	.04	2.32	2013.23	107.00
251360.000	21837.00	170.31	2.31	.05	4.63	2149.68	107.00
251560.000	5395.20	165.72	.04	.04	.00	1879.32	200.00
251560.000	10120.00	167.27	1.55	.07	1.55	1970.28	200.00
251560.000	12870.00	168.08	.81	.08	2.35	2017.79	200.00
251560.000	21837.00	170.40	2.32	.09	4.68	2154.33	200.00
* 253550.000	5395.20	166.13	.00	.41	.00	1561.67	1990.00
* 253550.000	10120.00	167.85	1.72	.58	1.72	2177.02	1990.00
* 253550.000	12870.00	168.69	.84	.61	2.56	2288.71	1990.00
* 253550.000	21837.00	171.01	2.32	.61	4.88	2485.63	1990.00
* 256530.000	5395.20	169.71	.00	3.58	.00	510.33	2980.00
256530.000	10120.00	172.16	2.45	4.31	2.45	675.28	2980.00
256530.000	12870.00	173.09	.94	4.40	3.39	738.33	2980.00
256530.000	21837.00	175.32	2.22	4.31	5.61	929.78	2980.00
* 261680.000	5395.20	171.76	.00	2.05	.00	1874.92	5150.00
* 261680.000	10120.00	174.54	2.78	2.38	2.78	2082.20	5150.00
* 261680.000	12870.00	175.65	1.15	2.60	3.93	2251.98	5150.00
* 261680.000	21837.00	178.49	2.80	3.18	6.74	2674.70	5150.00
* 264830.000	5395.20	172.66	.00	.91	.00	501.85	3150.00
* 264830.000	10120.00	175.50	2.84	.96	2.84	625.97	3150.00
* 264830.000	12870.00	176.70	1.19	1.01	4.03	678.13	3150.00
* 264830.000	21837.00	179.62	2.92	1.13	6.96	806.16	3150.00
* 265780.000	5395.20	173.25	.00	.59	.00	314.98	950.00
* 265780.000	10120.00	176.31	3.06	.81	3.06	404.64	950.00
* 265780.000	12870.00	177.61	1.30	.92	4.37	447.59	950.00
265780.000	21837.00	180.64	3.02	1.22	7.39	755.35	950.00
265908.000	5395.20	173.27	.00	.12	.00	110.00	128.00
265908.000	10120.00	176.36	3.09	.06	3.09	110.00	128.00
265908.000	12870.00	177.59	1.23	-.02	4.22	110.00	128.00
265908.000	21837.00	181.17	3.58	.34	7.80	765.45	128.00
265932.000	5395.20	173.38	.00	.01	.00	110.00	24.00
265932.000	10120.00	176.69	3.31	.22	3.31	110.00	24.00
265932.000	12870.00	178.29	1.60	.69	4.91	110.00	24.00
265932.000	21837.00	182.36	5.07	2.18	9.98	838.15	24.00
266050.000	5395.20	173.53	.00	.15	.00	321.87	118.00
266050.000	10120.00	177.12	3.59	.44	3.59	431.36	118.00
266050.000	12870.00	178.92	1.80	.63	5.39	550.85	118.00
266050.000	21837.00	183.45	4.53	.09	9.91	839.29	118.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
266430.000	5395.20	173.93	.00	.39	.00	323.90	380.00
266430.000	10120.00	177.55	3.66	.47	3.66	436.99	380.00
266430.000	12870.00	179.35	1.80	.47	5.46	567.68	380.00
266430.000	21837.00	183.81	4.48	.42	9.95	848.63	380.00
267638.000	5395.20	175.14	.00	1.21	.00	443.26	1208.00

267630.000	10120.00	178.97	3.83	1.78	3.83	581.83	1208.00
267630.000	12870.00	183.76	1.79	1.37	5.62	645.97	1208.00
267630.000	21837.00	185.15	4.39	1.27	10.01	921.27	1208.00
267815.000	5395.20	175.29	.00	.15	.00	148.00	177.00
267815.000	10120.00	179.03	3.74	.06	3.74	148.00	177.00
267815.000	12870.00	180.76	1.73	.00	5.47	148.00	177.00
267815.000	21837.00	185.27	4.51	.13	9.98	881.41	177.00
267845.000	5395.20	175.31	.00	.02	.00	148.00	30.00
267845.000	10120.00	179.06	3.75	.03	3.75	148.00	30.00
267845.000	12870.00	181.21	2.15	.45	5.90	148.00	30.00
267845.000	21837.00	187.15	5.94	1.98	11.84	1044.27	30.00
267940.000	5395.20	175.37	.00	.06	.00	421.40	95.00
267940.000	10120.00	179.28	3.92	.23	3.92	561.29	95.00
267940.000	12870.00	181.55	2.26	.34	6.18	642.02	95.00
267940.000	21837.00	187.19	5.64	.03	11.81	1025.80	95.00
268647.000	5395.20	176.17	.00	.80	.00	449.51	707.00
268647.000	10120.00	180.05	3.88	.75	3.88	588.33	707.00
268647.000	12870.00	182.20	2.15	.65	6.03	665.27	707.00
268647.000	21837.00	187.65	5.45	.46	11.48	1049.03	707.00
268648.000	5395.20	176.21	.00	.05	.00	489.67	1.00
268648.000	10120.00	180.09	3.88	.05	3.88	559.62	1.00
268648.000	12870.00	182.24	2.14	.04	6.02	623.43	1.00
268648.000	21837.00	187.65	5.42	.01	11.44	1211.86	1.00
268651.000	5395.20	176.22	.00	.00	.00	489.76	3.00
268651.000	10120.00	180.10	3.88	.00	3.88	559.69	3.00
268651.000	12870.00	182.24	2.14	.00	6.02	623.53	3.00
268651.000	21837.00	187.66	5.42	.00	11.44	1212.59	3.00
268652.000	5395.20	176.19	.00	-.03	.00	450.35	1.00
268652.000	10120.00	180.07	3.88	-.03	3.88	589.04	1.00
268652.000	12870.00	182.22	2.15	-.02	6.03	665.88	1.00
268652.000	21837.00	187.65	5.44	.00	11.46	1049.49	1.00
268653.000	5395.20	176.19	.00	.00	.00	450.38	1.00
268653.000	10120.00	180.07	3.88	.00	3.88	589.07	1.00
268653.000	12870.00	182.22	2.15	.00	6.03	665.91	1.00
268653.000	21837.00	187.65	5.44	.00	11.46	1049.31	1.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLOB
268654.000	5395.20	176.19	.00	.00	.00	450.41	1.00
268654.000	10120.00	180.07	3.88	.00	3.88	589.11	1.00
268654.000	12870.00	182.22	2.15	.00	6.03	665.94	1.00
268654.000	21837.00	187.65	5.43	.00	11.46	1049.34	1.00
268655.000	5395.20	176.19	.00	.00	.00	450.45	1.00
268655.000	10120.00	180.07	3.88	.00	3.88	589.14	1.00
268655.000	12870.00	182.22	2.15	.00	6.03	665.97	1.00
268655.000	21837.00	187.65	5.43	.00	11.46	1049.37	1.00
268657.000	5395.20	176.19	.00	.00	.00	450.51	2.00
268657.000	10120.00	180.07	3.88	.00	3.88	589.21	2.00
268657.000	12870.00	182.22	2.15	.00	6.03	666.03	2.00
268657.000	21837.00	187.66	5.43	.00	11.46	1049.43	2.00
268660.000	5395.20	176.20	.00	.00	.00	450.61	3.00
268660.000	10120.00	180.08	3.88	.00	3.88	589.30	3.00
268660.000	12870.00	182.22	2.15	.00	6.03	666.11	3.00
268660.000	21837.00	187.66	5.43	.00	11.46	1049.53	3.00
268700.000	5395.20	176.24	.00	.04	.00	451.89	40.00
268700.000	10120.00	180.11	3.86	.04	3.88	590.57	40.00
268700.000	12870.00	182.26	2.14	.03	6.02	667.25	40.00
268700.000	21837.00	187.68	5.42	.02	11.45	1050.73	40.00
269000.000	5395.20	176.50	.00	.27	.00	461.40	300.00
269000.000	10120.00	180.38	3.88	.27	3.88	600.87	300.00
269000.000	12870.00	182.50	2.12	.24	6.00	675.77	300.00
269000.000	21837.00	187.86	5.36	.18	11.36	1059.19	300.00

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1*************************************
*  HEC-2 WATER SURFACE PROFILES     *
*                                   *
*  Version  4.6.2;  May 1991        *
*                                   *
*  RUN DATE  16JUL01   TIME  15:31:28 *
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 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
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T1      FEMS BR WAYNE & JOHNSTON CO'S & GOLDSBORO FIS
T2      10 YR NATURAL
T3      LITTLE RIVER

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

                2                                                           61.60     .96

J2  NPROF     IEOUT     PREVS     XSECV     XSECH     FN        ALLOC     IBW       CHNIM     ITRACE

    1                   -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

       38         1         3        42        41        49         4         5         0        28
        1        13        14        15        55        26        56         0        38         1
       51        21        22        54         4         0       158       201

NC      .10       .10       .048      .1        .3
QT         6      7100     13600     17400     30000     17400     17400
ET                 9.11      9.11      9.11                                          0600      2300
ET                                                     9.11                          0940      1960
X1         1        30      1600      1660         0         0         0         0         0         0
GR        85         0      72.0        70      70.0       120      60.0       130      60.0       170
GR      64.8       290      64.6       400      62.2       470      60.8       540      60.0       670
GR      62.0       700      64.0       800      65.4       910      64.0      1020      62.0      1070
GR      60.0      1290      60.0      1300      57.0      1400      57.0      1500      54.5      1600
GR      48.5      1610      48.5      1650      54.5      1660      58.0      1900      60.0      1920
GR      62.0      1930      64.0      1960      65.1      2050      64.7      2290        85      2300

ET                 9.11      9.11      9.11                                          0600      2308
ET                                                     9.11                          0900      1940
X1       150                   0         0       158       150       150         0         0         0

ET                 9.11      9.11      9.11                                          0900      3000
ET                                                     9.11                          1040      2150
X1       388        29      1787      1858       158       150       150         0         0         0
GR        85         0      71.5       185      70.4       370      70.0       410      60.0       630
GR      62.7       710      60.0       820      60.0       950      65.4      1190      64.0      1380
GR      65.0      1550      57.2      1700      56.84     1717      53.5      1787     52.74      1800
GR      51.1      1805      48.9      1815      58.6      1818      57.6      1827      55.2      1837
GR      55.0      1846      58.5      1858     56.24      1862     57.84      2038     58.24      2078
1
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GR     58.44      2098      60.0      2180      68.5      2900        85      3000

ET                 9.11      9.11      9.11                                          1000      3008
ET                                                     9.11                          1140      2198
X1       500         0         0         0       208       208       208         0         0         0

ET                 9.11      9.11      9.11                                          1600      2300
ET                                                     9.11                          1598      2528
X1       900        31      2000      2035       400       400       400         0         0         2
GR        85         0      68.0        40      66.0        50      64.0        60      62.0        70
GR      62.0       410      64.0       530      64.0      1250      62.0      1260      60.0      1270
GR      60.0      1330      62.0      1350      64.0      1370      65.5      1428      68.0      1558
GR      58.0      1700      56.5      1858      55.6      2060      50.0      2025      52.0      2065
GR      58.2      2075      56.2      2208      59.0      2300      60.0      2478      62.0      2498
GR      64.0      2498      66.0      2508      66.5      2750      66.7      2988      68.0      3138
GR        85      3200

ET                 9.11      9.11      9.11                                          0960      1680
ET                                                     9.11                          1100      1688
X1      1408        43      1588      1598       588       588       588         0         0         0
GR        85         0      72.0       140      70.4       440      70.0       610      68.5       620
GR      66.0       630      60.0       640      60.0       700      62.0       710      62.0       800
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GR     62.0       900      60.0       950      60.0      1028      62.8      1100      64.0      1200
GR     66.0      1240      67.2      1300      66.0      1320      64.8      1358      62.0      1380
GR     60.0      1488      56.0      1500      58.5      1525      58.5      1580      59.1      1590
GR     60.0      1630      60.0      1650      59.7      1800      60.0      1820      60.0      2250
GR     62.0      2308      62.3      2320      62.0      2350      66.0      2440      66.0      2530
GR     62.0      2588      64.0      2598      66.0      2600      68.0      2818      70.0      3050
GR     72.0      3130      74.0      3170        85      3200

ET                                                     9.1                           0801      1588
ET                 9.11      9.11      9.11                                          1158      1588
ET                                                                 9.11              1158      1588
X1      2485        30      1193      1268      1085      1085      1085         0         2         9
GR        85         0        73       225      72.8       560      70.0       640      71.7       780
GR      70.0       820      68.0      1020      68.0      1061      68.9      1101      65.3      1118
GR      59.8      1127      58.9      1192      58.4      1200      52.2      1225      51.8      1214
GR      51.8      1225      51.8      1245      53.8      1252      52.7      1257      51.8      1268
GR      60.8      1300      61.1      1332      60.0      1340      60.5      1500      62.0      1700
GR      62.0      1940      62.0      2100      66.4      2400      71.4      2690        85      3200

ET                                                     9.1                           0001      1550
ET                 9.11      9.11      9.11                                          1158      1558
ET                                                                 9.11              1158      1550
X1      2535        20      1200      1275        50        50        50         0         0         0
GR        85         0        73       225      72.8       560      70.0       640      71.7       780
GR      70.0       838      68.0      1028      68.0      1180      63.0      1200      53.0      1250
GR      53.0      1325      60.0      1340      61.0      1375      61.0      1500      62.0      1700
GR      62.0      1940      62.0      2100      66.4      2400      71.4      2890        85      3200
1
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ET                                                                 9.11              1100      1500
X1      2595        24      1100      1500        60        60        60         0         0         0
X3        10                                                                        71.0      76.0
GR        85         0        72       450      71.7       660      72.5       900      70.0      1000
GR      70.0      1010      65.5      1100      61.0      1101      54.0      1150      54.0      1250
GR      64.0      1310      64.4      1350      61.0      1500      61.3      1600      64.0      1800
GR      62.0      2000      64.0      2100      62.0      2200      68.0      2380      66.0      2400
GR      68.0      2800      70.0      2840      70.7      2970        85      3010

SE      1.85      1.50       2.5         0        76       5.0      2638      5.02         0         0
ET                                                                 9.11              1100      1500
X1      2885        28      1180      1500        10        10        10         0         0         0
X2                             1      69.6      71.7
X3        10                                                                        71.7      76.0
ET        17         0        85      69.6       450      72.0      69.6       660      71.7      69.6
ET      1010      78.7      69.6      1100      76.9      69.6      1230      76.8      69.4      1300
ET      76.8      69.6      1500      76.8      65.6      1600      76.7      69.6      1800      76.0
ET      69.6      2200      76.0      69.6      2300      76.0      69.6      2400      76.0      69.6
ET      2800      76.0      69.6      2840      76.0      69.6      2970      76.0      69.6      3010
ET        85      69.6
GR        85         0      72.0       450      71.7       660      70.0      1010      70.0      1020
GR      69.5      1100      66.98     1101      54.38     1142      53.2      1150      52.6      1175
GR      53.5      1200      52.5      1230      55.4      1238      59.78     1250      63.28     1300
GR     64.78      1325      63.88     1500      61.28     1600      64.0      1800      62.0      2000
GR      64.0      2100      62.0      2200      66.0      2300      66.0      2400      68.0      2880
GR      70.0      2840      70.7      2970        85      3010

ET                 9.1       9.1       9.1                                           1000      1425
ET                                                     9.1                           0001      1425
ET                                                                 9.11              1000      1425
X1      2615        24      1100      1325        10        10        10         0         0         0
GR        85         0      72.9       450      71.7       660      70.6       800      70.0      1010
GR      70.0      1020      70.0      1040      66.0      1100      60.98     1101      54.0      1150
GR      54.0      1250      64.0      1325      70.0      1490      61.28     1600      64.0      1800
GR      62.0      2000      64.0      2100      62.0      2200      66.0      2300      66.0      2400
GR      68.0      2800      70.0      2840      70.7      2970        85      3010

ET                 9.1       9.1       9.1                                           1000      1500
ET                                                     9.1                           0001      1500
ET                                                                 9.11              1050      1500
X1      2675        21      1200      1300        80        60        80         0         0         0
GR        85         0      72.0       290      72.8       530      72.0       650      70.0       880
GR      66.8       890      66.8       910      64.0      1020      60.0      1210      62.0      1200
GR      52.0      1215      52.0      1285      61.0      1300      61.0      1400      60.0      1620
GR      60.0      2000      62.0      2040      64.0      2180      66.0      2220      67.7      2400
GR        85      3000

ET                 9.1       9.1       9.1                                           0900      1560
ET                                                     9.1                           0001      1560
ET                                                                 9.11              1100      1560
1
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X1      2735        35      1191      1265        60        60        60         0         0         0
GR        85         0      70.9       470      72.8       530      72.0       550      71.1       630
GR      70.0       800      66.0       920      64.0       990      60.8      1010      61.3      1019
GR      58.0      1042      59.0      1075      60.2      1191      58.5      1250      52.4      1210
GR      49.5      1219      51.5      1240      52.3      1257      55.6      1258      53.7      1265
GR      58.5      1280      59.4      1317      58.7      1368      59.2      1470      60.1      1500
GR      60.0      1650      60.0      2070      62.0      2120      64.8      2150      66.0      2180
GR      67.7      2400      66.8      2680      68.0      2800      70.9      2848        85      2950

ET                                                                 9.11              0600      1600
X1      4400        33       981      1032      1868      1520      1665         0         0         0
GR        85         0      74.0      60.0      74.0       120      74.2       200      74.1       300
GR      73.0       500      61.8       640      61.5       913      60.8       981      58.3      1003
GR      52.2      1058      53.6      1016      51.2      1048      52.8      1068      56.8      1055
GR      67.4      1072      67.5      1100      67.1      1127      60.1      1150      60.0      1190
GR      59.9      1230      60.3      1260      62.0      1400      64.8      1420      66.0      1428
GR      66.3      1500      66.0      1600      65.3      1650      66.0      1698      61.7      1795
GR      56.5      1898      76.5      1958        85      2700
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ET                                          9.11                  0800    1800
X1    5900      25    1300    1380    1310    1450    1500       0       0       0
GR      85       0    76.0     140    74.0     480    72.0     720    70.0     760
GR    68.0     830    66.0     850    64.0     950    62.0    1050    62.0    1000
GR    61.5    1300    53.5    1325    53.5    1365    64.5    1380    82.0    1630
GR    64.0    1660    66.0    1680    68.0    1770    70.0    1820    71.0    1900
GR    70.0    2130    70.0    2270    70.0    2360      72    2460      85    2300

ET                                          9.11                  1500    2500
X1    7200      33    2000    2100    1300    1100    1700       0       0       0
GR      85       0    78.0     150    78.4     320    80.0     680    80.7     720
GR    80.1     940    80.0     970    78.0    1000    76.0    1030    74.0    1060
GR    72.0    1080    70.0    1100    68.0    1120    66.0    1140    64.0    1230
GR    63.0    1600    62.3    1800    60.2    1834    61.6    1900    62.8    2000
GR    54.6    2010    53.7    2017    53.3    2027    55.0    2045    56.3    2056
GR    62.0    2100    61.0    2165    61.1    2225    61.8    2280    64.0    2400
GR    68.0    2500    71.0    2600      85    2700

ET            9.11    9.11    9.11                                    1300    2000
ET                                          9.11                      1300    3950
X1    8070      18    1700    1820     700     710     870       0       0       0
GR      85       0    78.6     100    76.0     360    74.0     460    72.0     490
GR    70.0     500    66.0     700    64.0    1220    64.0    1530    63.0    1700
GR    58.0    1720    56.0    1765    62.0    1800    62.0    1820    64.0    1920
GR    63.3    2000    68.0    2200    71.0    2300      85    2700

ET                                          9.11                  1540    2130
X1    8110      36    1900    2020      40      40      40       0       0       0
GR      85       0    78.0     130    78.0     160    78.0     220    76.2     400
GR    76.0     440    74.0     670    74.0     700    74.0     710    74.0     720
GR    74.0     750    74.0    1250    74.0    1270    74.0    1300    74.6    1350
GR    74.0    1400    72.0    1510    70.0    1520    64.0    1530    64.0    1570
GR    66.0    1580    70.0    1590    72.0    1600    74.0    1620    74.0    1830
GR    72.0    1840    70.0    1850    64.0    1860    63.0    1900    56.0    1920
GR    56.0    1960    62.0    2020    64.0    2100      72    2120      74    2300
1
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GR      85    2300

ET             9.1     9.1     9.1     9.1                            1565    2355
ET                                          9.11                      1540    2130
X1    8135       0       0       0      25      25      25       0       0       0

ET             9.1     9.1     9.1     9.1                            1360    2040
ET                                          9.11                      1400    1970
X1    8170      18    1700    1920      35      35      35       0       0       0
GR      85       0    78.6     100    76.0     360    74.0     460    72.0     490
GR    70.0     500    66.0     700    64.0    1220    64.0    1530    63.0    1700
GR    56.0    1720    56.0    1770    62.0    1800    64.0    1920    65.5    2000
GR    68.0    2200    71.0    2300      85    2700

ET             9.1     9.1     9.1     9.1                            1880    2160
ET                                          9.11                      1880    2160
X1    8735      27    2000    2115     565     565     565       8       0       0
GR      85       0    78.4     320    76.5     610    76.0     970    72.0     980
GR    70.0     990    64.0    1060    63.0    1700    63.1    1800    63.7    1900
GR    63.2    2000    55.0    2010    54.3    2016    53.9    2024    54.7    2038
GR    55.1    2054    57.5    2060    58.9    2085    61.9    2115    63.1    2118
GR    63.2    2256    68.2    2300    70.0    2400    76.0    2600    78.0    2700
GR    79.0    2950      85    3000

ET             9.1     9.1     9.1     9.1                            1902    2212
ET                                          9.11                      1910    2160
X1    8825       0       0       0      90      90      90       0       0       0

ET             9.1     9.1     9.1     9.1                            1940    2210
ET                                          9.11                      1940    2210
X1    8855      20    2058    2156      30      30      30       0       0       0
GR      85       0    78.4     320    76.5     610    76.0     970    72.0     980
GR    70.0     990    64.0    1060    63.0    1700    63.1    1800    63.7    1900
GR    63.2    2000    62.6    2058    55.5    2065    54.5    2075    55.1    2100
GR    55.7    2125    58.8    2130    64.4    2150    65.8    2156    66.3    2176
GR    66.9    2200    70.5    2300    72.8    2400    76.0    2600    78.0    2700
GR      85    2950

ET                                          9.11                      1800    2083
X1    8870      38    1800    2083      15      15      15
X3      10                                                    78.9    78.0
GR      85       0      78     375      76     520      74     530      75     540
GR      70     570      70     870      63    1600    62.5    1799      76    1800
GR      66    1820      65    1825    62.6    1858    55.5    1865    54.8    1875
GR    55.8    1925      58    1930    65.8    1955      76    1972      66    1975
GR    61.5    1998    74.5    2000    74.5    2005    61.5    2025    60.5    2028
GR    59.5    2033    57.5    2034    57.5    2037    59.5    2038    61.5    2055
GR    62.5    2060    74.5    2078      76    2083      63    2100      67    2300
GR      73    2400      78    3000      85    3500
1
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NC     .05     .05    .040
ET                                          9.11                      1800    2083
X1    8885      30    1800    2083      15      15      15
BT       4    1800    78.8      76    1973    78.8      76    2000      78    74.5
BT    2083      78    74.5
GR      85       0      78     100    78.9    1800      66    1820      65    1825
GR    67.6    1859    55.5    1865    54.6    1875    55.6    1925      58    1930
GR    65.8    1955      76    1973      76    2000    74.5    2000    74.5    2005
GR    61.5    2033    60.5    2028    59.5    2032    57.5    2034    57.5    2037
GR    59.5    2038    61.5    2055    67.5    2060    74.5    2078    74.5    2083

GR      78    2083      78    2100      78    2900      79    3000      85    3500

ET                                          9.11                      1800    2083
X1    8915       8                      30      30      33
X2                                                       1

NC      .1      .1    .040
ET                                          9.11                      1800    2083
X1    8945      38    1800    2083      30      30      33
X3      10                                                    78.9    78.0
GR      85       0      78     375      76     520      74     520      75     540
GR      70     570      70     870      63    1600    62.5    1799      76    1800
GR      66    1820      65    1825    62.6    1858    55.5    1865    54.6    1875
GR    55.8    1925      58    1930    65.8    1955      76    1973      66    1975
GR    61.5    1998    74.5    2000    74.5    2005    61.5    2025    60.5    2028
GR    59.5    2033    57.5    2034    57.5    2037    59.5    2038    61.5    2055
GR    62.5    2060    74.5    2078      76    2083      63    2100      67    2300
GR      73    2400      79    3000      85    3500

ET             9.1     9.1     9.1     9.1                            1982    2252
ET                                          9.11                      1980    2230
X1    8950      29    2058    2171       5       5       5       0       0       0
GR      85       0    78.4     240    78.0     460    76.0     560    72.0     580
GR    70.0     670    68.0     910    66.0     990    64.0    1250    64.0    1600
GR    64.0    1720    64.0    1890    64.0    1920    64.3    1924    62.6    2000
GR    62.6    2058    55.5    2065    54.5    2075    55.7    2125    58.0    2130
GR    64.4    2150    65.7    2156    68.2    2171    68.9    2175    66.9    2200
GR    70.5    2200    72.8    2400    74.0    2500      85    2800

ET             9.1     9.1     9.1     9.1                            1880    2300
ET                                          9.11                      1880    2300
X1    8975      27    2092    2187     120     120     120
GR      90       0    78.4     240    78.0     460    76.0     560    72.0     580
GR    70.0     670    66.6     910    66.0     990    64.0    1250    64.0    1600
GR    64.2    2023    64.9    2065    61.8    2092    58.3    2100    55.8    2108
GR    55.4    2135    55.2    2155    57.1    2164    55.3    2165    55.6    2176
GR    62.7    2187    63.5    2200    67.5    2400    73.6    2412    74.0    2500
GR    76.0    2800      90    3000
1
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ET            9.11    9.11    9.11                                    0900    2500
ET                                          9.11                      0920    1920
X1   10360      33    1066    1198    1085    1285    1285       0       0       0
GR      90       0    76.0      35    74.0      40    72.0      45    70.0      50
GR    68.0      60    66.0      98    63.1     450    66.0     540    67.0     700
GR    68.0     820    67.0     876    70.0     920    65.8     991    65.4    1045
GR    65.8    1066    63.7    1093    61.6    1100    59.5    1105    57.5    1125
GR    56.8    1133    55.5    1150    55.4    1175    58.0    1184    64.9    1169
GR    65.9    1198    65.1    1208    64.9    1260    62.3    1400    64.8    1420
GR    66.0    2000    66.2    2100      90    2500

ET            9.11    9.11    9.11                                    1600    4180
ET                                          9.11                      1650    3620
X1   13400      40    3492    3598    3140    2940    3040       0       0       0
GR      90       0    78.9     230    76.0     420    74.0     440    72.0     450
GR    70.0     750    74.1    1050    75.2    1160    70.0    1310    66.3    1500
GR    64.0    1760    64.0    2000    66.0    2200    66.0    2260    70.0    2300
GR    66.0    2500    66.0    2640    66.0    2990    67.0    3276    65.3    3295
GR    64.1    3343    65.8    3391    65.4    3445    65.9    3466    63.7    3493
GR    61.6    3500    59.6    3505    57.5    3525    56.8    3537    55.5    3550
GR    55.5    3575    58.1    3583    64.9    3590    64.9    3600      74    3620
GR      76    3880      76    3980      78    4040      80    4080      74    4180

ET            9.11    9.11    9.11    9.11                            1440    2700
ET                                          9.11                      1600    2500
X1   15400      13    2175    2280    2000    1700    2000       0       0       0
GR      90       0    74.0     210      75     450      74     520      70     530
GR    69.7    1050    66.0    1118    66.0    1160    66.0    2175    62.0    2200
GR    57.0    2215    57.0    2285    66.0    2290    67.5    2358    66.5    2450
GR      75    2500      90    2700

ET            9.11    9.11    9.11    9.11                            1900    2300
ET                                          9.11                      1920    2240
X1   16435      23    1982    2080    1035    1035    1035
GR      90       0      78     100    79.5     500      80     700    80.5    1700
GR    66.9    1800    70.6    1920    69.3    1943    67.8    1982    67.4    1990
GR    59.1    2002    58.8    2010    57.5    2025      55    2040      55    2050
GR      56    2060    66.1    2080    67.5    2128    66.5    2250    65.5    2300
GR      70    3300      88    3700      90    4200

ET                                          9.11                      2000    2173
X1   16705      29    2000    2173     270     270     270
X3      10
GR      90       0      78     100    79.5     500      80     700    80.5    1700
GR      80    1900      75    1950    68.7    1998      82    2000    68.7    2001
GR      66    2005      64    2042      58    2050      58    2075    59.4    2090
GR      58    2100    59.5    2115    64.1    2120      66    2125    66.8    2150
GR    69.5    2172      82    2173    69.5    2174      64    2200    72.5    2300
GR    67.3    2400      70    3300      89    3700      86    4700
1
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NC     .04     .04    .040
ET                                          9.11                      2000    2173
X1   16725      78    2000    2173      20      20      20
BT       3    2000    85.6    81.9    2087    85.7      82    2173    85.5      82
GR     100       0    86.4     100      90     330    79.5     430      82     700
GR    80.3     850      80    1000    79.7    1200      80    1300    81.8    1550
GR      82    1680    83.9    1800    84.9    1900    85.6    2000    88.7    2001
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GR      66      2065      64      2042      58      2050      59      2075      59.6      2067
GR      54      2100      59.5      2115      64.1      2120      66      2125      66.8      2150
GR      69.5      2172      65.5      2152      65.5      2208      65.5      2300      65.2      2400
GR      85      2600      84.5      3500      84.3      3700      84.5      3600      85      3706
GR      90      4200

ET                                                  9.11                                  2000      2173
X1      16755      0      0      0      30      30      30
X2                                                  1

ET                                                  9.11                                  2000      2200
X1      16770      29      2000      2200      15      15      15
X2      10
GR      100      0      79      100      78      400      79      850      78      1200
GR      79      1550      82.5      1800      83.5      1900      84      2000      68.7      2001
GR      66      2065      64      2042      58      2050      58      2075      59.6      2088
GR      59      2100      59.5      2115      64.1      2120      66      2125      66.8      2158
GR      69.5      2190      84      2260      84      2100      83.5      2600      82      3000
GR      83      3200      82      3400      84      3700      90      4200

ET                                                  9.11                                  2000      2200
X1      16785      43      2000      2238      15      15      15
RT      6      2000      85.6      81.8      2033      85.6      81.8      2033      85.6      81.3
RT      2205      85.6      81.3      2205      85.6      81.8      2238      85.6      81.9
GR      100      0      80.6      100      80      150      79.5      400      80      700
GR      80.2      850      80      1000      79.7      1200      80      1300      80.9      1552
GR      82      1590      84      1735      84.5      1800      85.5      1900      85.6      2009
GR      80.6      2001      80.6      2066      69.2      2025      67.2      2033      65      2058
GR      64.4      2066      60      2078      59.2      2075      58.1      2100      58.8      2120
GR      54.1      2125      59.1      2145      64.4      2150      62      2175      68.5      2205
GR      69.2      2215      80.5      2233      80.6      2227      85.6      2238      85.4      2300
GR      85.2      2400      84.8      2500      84.5      2600      84.4      3000      84.3      3206
GR      85.4      3400      85      3700      90      4700

ET                                                  9.11                                  2000      2200
X1      16815                                       30      30      30
X2                                                  1

ET                                                  9.11                                  2000      2200
X1      16845      29      2000      2200      30      30      30
X3      10
GR      100      0      79      100      78      400      79      850      78      1200
GR      79      1550      82.5      1800      83.5      1900      84      2000      68.7      2001
GR      66      2065      64      2042      58      2050      58      2075      59.6      2090
GR      59      2100      59.5      2115      64.1      2120      66      2125      66.8      2150
GR      69.5      2190      84      2200      84      2300      83.5      2600      83      3800
1
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GR      83      3200      82      3400      84      3700      90      4200

MC      .1      .2      .040
ET                  9.1      9.1      9.1                                  1924      2224
ET                                                  9.11                                  1924      2224
X1      16875      21      2000      2166      30      30      30
GR      90      0      79      100      79.5      500      80      700      78.1      1400
GR      76      1700      65.7      1780      65.1      1850      66      2000      60      2004
GR      56.5      2025      57      2040      61.4      2070      64.5      2110      64.6      2124
GR      69.2      2146      68.9      2265      71      2600      74.5      2610      74.5      4000
GR      90      4100

ET                  9.11      9.11      9.11                                  1640      3000
ET                                                  9.11                                  1660      2600
X1      19900      25      2000      2080      2570      2520      3025      0      0      0
GR      90      0      80      100      78      800      80      1100      80.0      1540
GR      78.8      1650      78.0      1678      74.0      1660      72.0      1770      66.0      1906
GR      71.8      1850      70.0      1910      66.0      1930      61.0      2000      57.5      2038
GR      57.5      2060      66.0      2080      66.5      2100      68.0      2150      68.9      2285
GR      68.8      2578      70.0      2600      77      4500      80      7000      90      7100

ET                  9.11      9.11      9.11                                  1920      3800
ET                                                  9.11                                  1930      3566
X1      22800      24      1978      2120      2550      2100      2900      0      0      0
GR      90      0      80      100      80.0      600      78      700      78      1920
GR      76.7      1955      76.0      1968      74.0      1970      72.0      1980      70.0      1985
GR      70.8      1998      68.0      2004      62.0      2020      62.0      2065      68.0      2090
GR      70.0      2120      68.0      2150      68.9      2285      70      2300      72      2700
GR      74      3600      78      5000      83      7000      85      7100

ET                  9.11      9.11      9.11                                  1700      4400
ET                                                  9.11                                  2650      4250
X1      25800      29      3483      3609      2850      2430      3000      0      0      0
GR      90      100      80      200      78      1000      78.0      1430      78.5      1650
GR      78.0      1720      76.0      2000      74.0      3200      70.8      3324      73.3      3366
GR      67.9      3487      72.6      3410      70.9      3474      71.1      3483      68.5      3500
GR      65.1      3583      63.1      3525      62.8      3550      62.5      3566      64.9      3581
GR      68.1      3592      71.4      3609      71.2      3651      66.5      3700      66.0      3800
GR      66.0      3810      70.6      4000      80      6000      90      10000

ET                  9.11      9.11      9.11                                  1100      4000
ET                                                  9.11                                  1400      2800
X1      28900      68      1509      1600      2850      2930      3100      0      0      0
GR      122.0      0      120.0      150      118.0      248      118.0      298      114.0      362
GR      112.0      470      110.0      660      106.0      492      106.0      523      104.0      540
GR      102.8      560      100.0      670      98.0      670      96.0      698      94.0      840
GR      92.0      945      90.0      990      88.5      1030      86.5      1110      86.0      1320
GR      86.5      1150      86.0      1150      86.0      1190      86.9      1203      86.0      1220
GR      86.9      1250      86.0      1290      86.0      1330      86.0      1390      84.0      1408
GR      80.0      1420      78.0      1438      76.0      1448      74.0      1450      72.0      1468
GR      70.0      1480      69.0      1500      65.5      1525      65.5      1575      70.0      1592
GR      72.5      1600      70.0      1660      70.0      1745      72.0      1765      74.5      1780
GR      80      6500      85      9100      90      8000
1
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ET                  9.11      9.11      9.11                                  0001      4000
ET                                                  9.11                                  0650      3300
X1      32400      24      1200      1300      2100      2000      3500      0      0      0
GR      90.0      0      88.0      20      86.0      60.0      84.0      92      82.0      105
GR      80.0      120      84.0      130      80.0      150      87.0      230      80.0      270
GR      76.0      400      76.0      480      76.0      660      74.0      860      72.0      1200
GR      66.0      1210      66.0      1270      72.0      1300      74      1500      75      1600
GR      75      2200      80      6000      83      9300      90      9100

ET                                                  9.11                                  1200      2400
X1      36600      24      1498      1569      4100      4100      4200      0      0      0
GR      90      0      84      400      84      850      82      1250      80      1350
GR      79.5      1437      75.3      1498      70.0      1500      61.5      1505      64.0      1525
GR      69.1      1560      72.0      1565      73.8      1589      74.0      1652      75.0      1760
GR      75.0      2000      80      2300      82      2600      82      3000      80      3100
GR      80      3600      82      3700      81      4000      81      4500

ET                                                  9.11                                  0500      2200
X1      38300      20      1500      1650      1700      1700      1700      0      0      0
GR      95      0      80.5      500      80.5      1000      78.0      1200      77.4      1300
GR      77.0      1347      77.0      1350      76.5      1437      76.0      1498      76.0      1500
GR      65.0      1515      65.0      1580      72.5      1615      82      1650      82      1700
GR      80      1800      78      2500      78.0      3000      85      4000      95      4500

ET                                                  9.11                                  1200      3200
X1      40100      20      2900      3035      1800      1800      1800      0      0      0
GR      95      0      65      500      76.2      2700      75.5      2762      74.9      2800
GR      76.4      2813      76.8      2900      70.0      2918      68.2      2925      68.0      2950
GR      67.7      2980      66.5      2995      72.9      3000      75.1      3023      81.3      3035
GR      82.8      3055      83.8      3074      81.1      3100      85      3700      85      4000

ET                                                  9.11                                  1400      3400
X1      41050      27      2415      2525      990      990      990
GR      100      550      95      590      90      620      85      650      84      1000
GR      83.3      2000      83.2      2300      75.1      2335      75.4      2365      76.9      2385
GR      74.4      2399      74.6      2415      70.9      2417      68.5      2445      69.0      2511
GR      74.6      2525      72.3      2528      72.8      2537      74.6      2551      72.3      2622
GR      72.3      2720      74.9      2761      81.0      2820      83      3500      84      5500
GR      85      7100      100      7400

ET                                                  9.11                                  1200      3200
X1      44420      25      1842      1940      3660      3000      3330
GR      105      400      100      500      95      550      90      600      85      0900
GR      82.5      1060      77.3      1126      78.5      1538      75.8      1704      79.2      1826
GR      77.1      1842      70.8      1844      71.3      1884      70.2      1914      77.1      1940
GR      78.7      2004      77.4      2104      77.1      2204      76.8      2304      77.2      2404
GR      78.9      2468      84.7      2504      85      7500      90      7600      100      7700
1
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ET                                                  9.11                                  1400      3400
X1      47720      20      2038      2150      3800      3000      3300
GR      105      0      100      100      95      150      90      200      86      400
GR      85.3      0600      83.4      1597      83.1      2038      71.3      2066      71.4      2103
GR      74.6      2140      78.3      2350      78.8      2790      77.6      2759      83.7      2800
GR      85.0      2900      84.9      4000      85      7250      90      7500      100      7600

QT      7      6750      13000      16700      29800      16700      16700      9730
ET                                                  9.11                                  3685      5585
X1      56225      25      3714      3838      7500      8500      8500
GR      110      800      105      1000      100      1100      95      1200      92      1508
GR      90.4      3000      94.1      3458      92.1      3518      84.6      3564      84.5      3646
GR      84.4      3660      85.0      3680      82.1      3690      81.2      3714      76.8      3718
GR      75.3      3758      77.7      3808      84.8      3838      84.2      4002      84.1      4600
GR      85      5000      86      6000      90      6300      95      7000      100      7700

MM      .5      0.30      1650      0.10      2121      0.04      2207      0.10      2800      0.30
MM      6000
ET                                                  9.11                                  1950      2550
X1      59700      18      2121      2207      3180      3400      3480      .2
GR      110      0      105      500      100      1400      95      1650      90      1900
GR      88.4      1970      87.2      2061      84.6      2093      85.0      2121      79.6      2193
GR      74.2      2161      78.9      2205      86.4      2207      91.5      2600      95      2800
GA      100      3100      101      3500      110      6000

MM      .5      0.30      1970      0.10      2121      0.04      2207      0.10      2760      0.30
MM      6000
ET                                                  9.11                                  1950      2300
X1      60430      22      2121      2207      730      730      730
GR      110      0      105      500      100      1000      95      1200      92      1300
GR      90.8      1767      88.4      1970      87.2      2061      84.6      2093      85.0      2121
GR      78.4      2133      74.2      2161      78.9      2205      86.4      2207      91.5      2219
GR      92.7      2360      93.2      2419      95.8      2480      100      2500      101      2600
GR      105      3000      110      4000

MC      0.10      0.10      0.04
ET                                                  9.11                                  2056      2272
X1      60665      22      2056      2272      255      255      255
X3      10                                                                        96.1      86.1
GR      110      0      105      500      100      1000      95      1180      92      1300
GR      90.8      1767      87.2      2056      87.2      2061      86.6      2093      85.0      2121
GR      78.6      2133      74.2      2161      78.9      2205      86.4      2207      91.5      2219
GR      92.0      2372      93.2      2419      95.8      2585      100      2700      101      2380
GR      105      3600      110      5200

XR      0.25      1.5      2.5      0      24      6      2876      5.92      74.0      14.8
ET                                                  9.11                                  2056      2272
X1      60715                                       30      30      30
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X2                                  1      95.1     97.6
X3      10                                                          98.0     98.5
ET      21        1000     101.1       0     1100     99.9        0  1200     98.6        0
BT    1200       94.1        0     1400     97.1        0     1500  97.7        0     1600
BT    97.7          0     1700     97.6        0     1800     97.6     0     1900     97.7
1
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BT       0     2000     97.5        0     2056     98.0     95.3  2272     98.8     95.1
BT    2300     98.8        0     2400     98.1        0     2500  98.6        0     2600
BT    98.9          0     2700     99.4        0     2800    100.5     0     2900    102.0
BT       0     3000    103.6        0

NH       5     0.30     1767     0.10     2121     0.04     2207     0.10     2595     0.30
NM    4000
ET                                                  9.11                                2300
X1   60964          20     2121     2207      249      249      249                      2300
GR     110         500      105      700      100     1150       95     1300       92     1350
GR    90.6        1767     87.2     2067     84.6     2093     85.0     2121     78.6     2132
GR    74.2        2161     78.9     2205     86.4     2207     91.5     2219     93.2     2419
GR    95.0        2595      100     2700      101     3600      105     3800      110     4000

MM       4     0.30     1200     0.10     2121     0.04     2207     0.10     3500
ET                                                  9.11                                2300
X1   61564          17     2121     2207      600      600      600                      2300
GR     110           0      105      600      100     1050       95     1200       98     1050
GR    87.2        2067     84.6     2093     85.0     2121     78.6     2133     74.2     2161
GR    78.9        2205     86.4     2207       95     2550       95     2756      100     2940
GR     105        3050      110     3500

MC     0.10      0.10     0.040
ET                                                  9.11                                1200     2700
X1   68410          21     1764     1849     6846     6846     6846                      2700
GR     110         700       94     1150     90.5     1400       88     1450       87     1500
GR    86.6        1550     86.5     1600     86.1     1620     86.1     1640     87.9     1660
GR    88.0        1746     83.3     1764     76.5     1770     76.0     1800     76.7     1842
GR    83.0        1849     86.2     1864     89.1     1900     93.9     2000    101.6     4000
GR     105        5000

ET                                                  9.11                                2200     3400
X1   82729          25     4263     4327    10000    12000    14310                      3400
GR     115           0      110      100      105      300      100      800       95     1100
GR    92.2        4000     92.5     4100     93.4     4181     89.0     4200     89.8     4263
GR    80.6        4268     80.4     4299     82.5     4327     81.6     4337     91.4     4413
GR    87.1        4433     86.8     4469     90.3     4503     99.1     4555     89.3     4767
GR    92.2        4853     93.7     4953       95     6100      100     6300      110     6500

ET                                                  9.11                                3200     6000
X1   92800          22     2768     2814     9100     9100    10860                     -0.6
GR     110         700      105     1500      100     1700       95     2000     92.1     2655
GR    89.1        2722     88.9     2768     86.4     2771     86.0     2786     85.2     2804
GR    92.1        2814     93.4     2828     89.0     2840     92.0     2850     95.0     2866
GR      96        3060       97     8000       98     8002      100     8150      105     9460
GR     110        8500      115     8550

ET                                                  9.11                                2500     6200
ET                9.11     9.11     9.11     9.11                                      2500     8200
X1   93600          26     2768     2810      800      800      800
GR     115         600      110     1000      105     1600      100     2000      100     2200
GR    100.8        2440     99.7     2540     98.0     2640     92.1     2655     89.8     2702
GR    89.7        2728     85.6     2738     84.5     2748     84.5     2850     86.2     2868
GR    92.1        2870     94.6     2881     95.3     2890     96.4     3014     96.4     3900
GR    100.0        8025    105.8     8100    110.0     8158    115.0     8200

IB     1.05      1.56      2.6        9     78.0        3     1840      4.5     84.5     84.5
ET                                                  9.11                                2500     6200
ET                9.11     9.11     9.11     9.11                                      2500     8200
X1   93745                                      30       30       30
X2                                  1      98.3     97.7
X3      10                                                          100.0    98.0
BT      20        2000    100.0        0     2200    100.8        0  2440    100.8        0     2703
BT    99.9        98.3     2782     98.9     98.3     2800     99.9     98.3     2881     99.9
BT    98.3        2998     99.7        0     3000     96.5        0  3100     99.4        0
BT    3200        96.0        0     3300     97.7        0     2400     97.8        0     3900
BT    97.8           0     8025    105.0        0     8100    110.0        0     8150    115.0
BT       0

ET                                                  9.11                                2500     6200
ET                9.11     9.11     9.11     9.11                                      2500     8200
X1   93950          26     2768     2810      165      165      165
GR     115         600      110     1000      105     1600      100     2000      100     2200
GR    100.8        2440     99.7     2540     98.0     2640     92.1     2655     89.1     2722
GR    89.9        2748     86.4     2771     84.0     2786     85.2     2804     91.5     2818
GR    97.6        2830     89.0     2840     90.0     2900     95.0     2968     96.4     3014
GR    96.4        3500     96.4     3900      100     7500      105     7950      110     8150
GR    115.0        8200
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ET                                                  9.11                                2500     5700
ET                9.11     9.11     9.11     9.11                                      2500     8200
X1   94410          26     2768     2810      468      468      468
GR     115         600      110     1000      105     1600      100     2000      100     2200
GR    100.8        2440     99.7     2540     98.0     2640     92.1     2655     89.1     2722
GR    89.9        2768     86.4     2771     86.0     2786     85.2     2804     91.5     2818
GR    93.4        2820     89.0     2840     90.0     2850     95.0     2866     96.4     3014
GR    96.4        3500     96.4     3900      100     7500      105     7900      110     8150
GR    115.0        8200

MC     0.10      0.10     0.040
ET                                                  9.11                                2600     6300
1
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X1  118700          20     5902     5960     6000     9500    16796
GR     120         800      115     1100      110     1250      105     1500      102     2000
GR    102.5        5000      101     5750     99.1     5902     91.5     5912     91.0     5922
GR    90.8        5943     92.9     5956     95.8     5960     96.0     5970     96.7     5975
GR     100        6100      102     6700      105     7500      106     9000      107     9408

ET                                                  9.11                                4200     5600
X1  119850          22     4402     4548     2500     2800     2150
GR     120         400      125      600      120      800      115     1000      110     2000
GR    104.8        4000    104.3     4078    101.7     4206     99.5     4402     91.9     4414
GR    91.4        4457     91.2     4564     93.3     4528     96.0     4548     94.7     4570
GR    98.1        4580     97.5     4623    102.4     4641    101.1     4721    102.9     4821
GR     105        6000      110     6400      115     6500

ET                                                  9.11                                2100     2850
X1  118530          22     2688     2815     4680     4680     4680
GR     120         500      125      800      120     1000      115     1180      110     1600
GR    103.5        2000    104.8     2448    104.3     2502    105.0     2580    105.5     2670
GR    99.8        2688     94.0     2702     91.6     2722     88.5     2767     93.4     2807
GR    99.3        2815    111.1     2865    111.0     2965    104.7     3045      110     4000
GR     115        4500      130     4800

ET                                                  9.11                                1150     1450
X1  121500          16     1240     1363     2970     2970     2970
GR    111.5        1000    111.2     1020    107.8     1050    104.1     1154     97.5     1176
GR    99.2        1190    104.5     1230    100.0     1240     93.3     1265     90.6     1286
GR    91.0        1326     94.3     1352    103.0     1369    104.2     1420    107.3     1467
GR    121.5        1520

ET                                                  9.11                                1200     1500
X1  123580          17     1265     1378     2080     2080     2080
GR    130.0         690    125.0      880    120.0     1009    117.7     1124    114.0     1141
GR    110.7        1171    105.4     1191     98.4     1265     94.5     1283     93.9     1321
GR    94.8        1355     95.8     1378    108.4     1511    114.9     1586    120.0     1850
GR    125.0        2025    130.0     3525

ET                                                  9.11                                1200     1500
X1  123659           0        0        0       79       79       79
MC     0.12      0.12     0.016
ET                                                  9.11                                1222     1522
X1  123660          18     1237     1506        1        1        1
GR    117.0        1125    112.7     1161    110.2     1215    109.8     1233    107.8     1237
GR    107.4        1259    109.3     1259    106.6     1281    106.3     1447    108.3     1447
GR    107.3        1457    107.3     1506    108.6     1508    108.2     1543    104.5     1643
GR    109.3        1693    112.4     1703    117.2     1803

ET                                                  9.11                                1222     1522
X1  123661           0        0        0        1        1        1
3
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MC     0.12      0.12     0.055
ET                                                  9.11                                1222     1622
X1  123662          16     1209     1327        1        1        1
GR    116.0         957    116.1     1057    108.6     1157    107.1     1176    103.4     1209
GR    97.5        1241     95.7     1315    102.6     1327    102.3     1375    104.4     1433
GR    106.9        1467    109.1     1485    117.2     1575    119.2     1867    125.0     1700
GR    130.0        1800

ET                                                  9.11                                1222     1522
X1  123663           0        0        0        1        1        1
ET                                                  9.11                                1222     1522
X1  123665           0        0        0        2        2        2
ET                                                  9.11                                1200     1500
X1  123670           0        0        0        5        5        5
ET                                                  9.11                                1200     1500
X1  123680           0        0        0       10       10       10
ET                                                  9.11                                1190     1490
X1  123720           0        0        0       40       40       40
ET                                                  9.11                                1250     1435
X1  123770          31     1299     1435       50       50       50
X2      10                                                                    112.0    112.0
GR    120.0         957    114.3     1120    111.3     1209    110.8     1219    109.3     1229
GR    106.6        1239    101.7     1249    100.1     1259     99.8     1269     99.1     1279
GR     98.6        1289     98.9     1299     97.6     1309     96.8     1319     98.0     1329
GR     99.9        1339    101.0     1349    101.7     1359    101.8     1369    102.8     1379
GR    102.3        1389    103.8     1399    105.0     1409    106.4     1419    106.6     1429
GR    106.9        1467    109.1     1485    117.2     1575    119.2     1807    125.8     1790
GR    130.0        1800
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 SB    1.25     1.50     2.6      0      15.38     5.8     1621      9.1      98.5     98.5
 ET                                               9.11                       1709     1435
 X1  123700                                 20       20       20
 X2                          1     111.3    113.3
 X1      10                                                          113.8    113.8
 BT      15      957    132.8      0       1000    125.3       0     1000    118.2        0
 BT    1100    114.2        0     1200     113.3        0     1289    119.3    111.3     1288
 BT    113.3    115.9     1322    119.4     111.3     1402    113.3    111.3     1435    113.4
 BT    111.3     1500    112.5        0     1600     114.8        0     1700    118.0        0
 BT    1700     125.0        0     1800     138.0        0
 NC    0.12     0.12    0.055
 ET                                               9.11                       1160     1460
 X1  123940       16     1209     1321      150      150      150
 GR    138.8      957    118.1     1057    108.6     1157    107.1     1178    103.4     1205
 GR     97.5     1247     95.7     1315    102.6     1327    102.3     1375    104.4     1422
 GR    106.9     1467    109.1     1485    117.2     1575    119.2     1607    125.0     1700
 GR    136.8     1800
1
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 ET                                               9.11                       9900     1200
 X1  125600       15      930     1040     1660     1660     1660
 GR    128      750      125      950      120      840      115      880      110      900
 GR    107.2    930     99.5      960     98.7     1020      105     1040      110     1100
 GR    112      1200     115     1300      120     1420      125     1560      130     1670
 ET                                               9.11                       9930     1260
 X1  127500       17      960     1030     1900     1900     1900
 GR    130      760      125      610      120      830      115      880      110      910
 GR    107.2    960    101.3      966     98.0      960     98.2      998     98.4     1008
 GR    102.4    1022    107.9     1030      118     1260      115     1350      128     1410
 GR    125      1490     130     1570
 ET                                               9.11                       9975     1250
 X1  128430       13     1062     1185      930      930      930
 GR    130      900    107.4     1056    107.2     1062      102     1090     98.8     1110
 GR     98.9     1125     99.1     1145    103.1     1170    108.6     1185    108.9     1211
 GR    112.7     1223    116.9     1253    152.1     1321
 ET                                               9.11                       9865     1160
 X1  130250       19      958     1036     1820     1820     1820
 GR    130      790      125      820      120      840      115      870      110      940
 GR    107.8     958    104.5      963     99.4      977     97.9      986    101.2     1022
 GR    102.5     1030    108.3     1036      110     1080      125     1120      120     1130
 GR    121      1170     123     1200      125     1830      130     1850
 ET                                               9.11                       9850     1250
 X1  130560       17     1058     1136      310      310      310
 GR    140      180      135      200      133      500      130      800      120      900
 GR    128      900    107.8     1058    104.3     1063     99.2     1073     97.7     1086
 GR    101      1122    103.3     1130    108.3     1136      110     1220      115     1380
 GR    130      1600     130     1820
 ET                                               9.11                       9950     1500
 X1  130860       28     1058     1130      300      300      300
 GR    140      190      135      200      122      500      120      800      128      800
 GR    120.0     900    107.8     1058    104.3     1063     99.2     1073     97.7     1086
 GR    101.0    1122    103.3     1150    108.3     1136    109.0     1200    109.5     1300
 GR    111.9    1400    112.1     1500    112.7     1600    115.9     1700    124.5     1742

 QT       7     6390    12300    15800    27400    15800    15800     8400
 NH       5     0.12     1700     0.12     1960    0.055     2030     0.12     2220     0.12
 NH    2390
 ET                     9.11     9.11     9.11     9.11                9.11      700     2390
 ET                                               9.11                       1380     2880
 X1  131160       18     1960     2030     0800     0600     0800
 GR    132      150      124      170      120      270      110      450      109.1     1700
 GR    109      1850     108     1960     102.4     1970     108.4     1975     97.9     1985
 GR    108.4    2020     108     2030      109     2035      112     2150      116     2220
 GR    117      2340     124     2380      132     2390
1
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 NH       5     0.12     2700     0.12     2960    0.055     3030     0.12     3300     0.12
 NH    5000
 ET                     9.11     9.11     9.11     9.11                9.11     1960     3000
 ET                                               9.11                       2380     3880
 X1  122650       17     2960     3030     0506     0890     0880
 GR    132      400      124      500      112      550      111      1350      118     1750
 GR    109.5    2700     108     2960     102.7     2970     100.7     2975     98.2     2985
 GR    100.7    3020     108     3030      112     3100      116     3130      120     3200
 GR    124      3300     128     5000
 NH       5     0.12     2500     0.12     2890    0.055     2900     0.12     3200     0.12
 NH    6800
 ET                     9.11     9.11     9.11     9.11                9.11     2000     6800
 ET                                               9.11                       2400     4200
 X1  124650       22     2800     2900     2300     1800     2000
 GR    148.5      200    146.2      400     141.4      570      130      700      128      750
 GR    124       820      120     1010     119.2     1056      116     1120      115     1500
 GR    134.5     1400      114     2700      112     2500     109.5     2800     102.6     2830
 GR    101.3     2820    100.2     2830     99.4     2840     98.7     2850     98.7     2865
 GR     99.2     2870     98.7     2880    100.2     2890     101.1     2900     109.9     3000
 GR    109      3200     104.5     4000      117     4200      114     4450      116     4560
 QT       1     8150     11900    15700    26830     15300     15300     7100
 NH       4     0.12     6340     0.12     6500    0.055     6570     0.12     6840
 ET                                               9.11                       2600     6000
 X1  144570       38     6500     6570     8000     9000     9920
 GR    148        8      132      200      128      900      174      900      120     1000
 GR    116     1040      116     2600      112     3100      116     3400      118     3500
 GR    118.2    3700      118     3600      120     5000     120.9     5300     122.5     3600
 GR    122      5500      120     5500     118.3     6348      114     6500     104.4     6505
 GR    103.9    6518    101.4     6520     102.5     6530     101.8     6540     102.4     6550
 GR    103.5    6560    103.9     6565      114      6570      116     6580     144.5     6840
 NH       5     0.12     4750     0.12     4955    0.055     5015     0.12     5150     0.12
 NH    5500
 ET                                               9.11                       1740     5040
 X1  145260       28     4955     5015     0400     0800     0890
 GR    132      400      117      800     118.5     1900      116     2130      116     2580
 GR    118     2700      120     2920      122     3100     123.7     3400     124.3     3700
 GR    124.3    3800     124.7     4300      124     4520      122     4530      120     4700
 GR    116      4750     115.5     4920      115     4955     107.6     4960     104.7     4985
 GR    107.6    5010      115     5015      112     5040      116     5080      120     5150
 GR    124      5320      128     5440      132     5500
 NH       5     0.12     3940     0.12     4337    0.055     4393     0.12     4520     0.12
 NH    5100
 ET                                               9.11                       2000     4500
 X1  145900       28     4337     4393     0600     0500     0640
 GR    132      800      128      900      127      950      124     1000      120     1100
 GR    119     1900      116     2100      116     2580      118     2700      122     2900
 GR    124     3190      131     3440      128     3640      126     3860      124     3870
 GR    120     3940      119     4260      116     4327     108.1     4340     105.5     4355
1
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 GR    105     4365      106     4385     108.1     4290      116     4393      117     4468
 GW    120     4520      124     5000      132     5100
 NH       5     0.12     2600     0.12     2927    0.055     2983     0.12     3100     0.12
 NH    5200
 ET                                               9.11                       1750     4150
 X1  147210       22     2927     2983     0400     0400     1330
 GR    132     1500      128     1600      124     1800      120     2130     119.3     2400
 GR    118     2600      120     2870      118     2890      117     2927     108.5     2930
 GR    107.1    2935     106.7     2945     107.6     2960     109.5     2980      117     2983
 GR    117      3050     117.8     3300      118     3980      120     4350      124     4500
 GR    128      4800      132     5200
 NC    0.12     0.12    0.055
 ET                                               9.11                       2220     3600
 X1  147940       25     2245     2345     0400     0400     0738
 GR    145.8      305    128.4      720     127.1      975     125.5     1370     126.7     1555
 GR    131.7     1985    123.2     2245     109.8     2260     108.1     2265     108.1     2285
 GR    107.3     2295    107.0     2305     107.8     2315     108.7     2335     109.8     2345
 GR    111.5     2360    113.0     2402     120.0     2470     122.8     2715     115.5     3305
 GR    124.2     3835    118.1     4440     127.7     4665     141.2     4845     161.7     5085
 ET                                               9.11                       2245     3600
 X1  148165        0        0        0      225      225      225                -.5
 X1      10                                                                   122.5     122.5
 SB    1.85     1.5      2.5        0       69        2     1561      2.8      107.3     107.5
 ET                                               9.11                       2245     3600
 X1  148195                                   30       30       30
 X2                          1     122.0    125.6
 X3      10                                                          125.5     125.5
 BT      18      200    138.2        0      400    129.3        0      825     127.5        0
 BT    1010    126.3        0     1360     126.8        0     1760     126.8        0     2965
 BT    126.1        0     2245    125.0    122.0     2400    125.0    122.0     2670    126.0
 BT       0     2980    125.9        0     3370    125.4        0     3660     125.6        0
 BY    3920    125.5        0     4320    127.8        0     4530     130.5        0     4780
 ET                                               9.11                       2220     3720
 X1  148340       28     2245     2345      145      145      145
 GR    121.7     1985    123.2     2245    109.8     2260     109.1     2265     108.1     2285
 GR    107.3     2295    107.0     2305     107.8     2315     108.7     2335     109.8     2345
 GR    111.5     2360    113.0     2402     120.0     2470     122.8     2715     115.5     3305
 GR    124.2     3835    118.1     4440     127.7     4665     141.2     4845     161.7     5085
 ET                                               9.11                       2150     1750
 X1  160220       25     1320     1390     11880    11880    11880
 GR    141.2      200    143.3      360     152.8      520     164.5      760     144.2      920
 GR    129.0     1140    119.0     1290     116.3     1310     115.7     3320     114.8     1330
 GR    113.8     1350    113.7     1360     124.0     1370     115.1     1380     115.8     1390
 GR    126.3     1420    118.5     1425     128.0     1588     129.8     1700     131.9     1890
 GR    134       2230      140     2700     150.5     2800     161.3     3870      162      3210
1
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 ET                                               9.11                       1685     2695
 X1  165810       26     2610     2650     5590     5590     5590                -1.0
 GR    153.4      275    145.1      525      137.5      785      132.8     1125     133.5     1525
 GR    136.1     1675    131.2     1665     123.5     2075     129.3     2315     127.3     2455
 GR    124.8     2510    123.5     2585     119.7     2605     119.2     2610     118.7     2615
 GR    115.7     2625    116.2     2635     116.9     2645     119.2     2650     119.7     2665
 GR    124.8     2685    142.2     2845     155.1     3125     162.7     3245     169.8     3545
 GR    175.5     3750
 NC    0.12     0.12    0.055
 ET                                               9.11                       1700     2691
 X1  169035       28     2481     2681      225      225      225
 X3      10                                                                    134.0     134.0
 GR    153.4      275    145.1      525      137.5      785      132.8     1125     133.5     1525
 GR    136.1     1675    131.2     1665     123.5     2075     129.3     2315     127.3     2455
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GR   127.3      2481      124.8      2510      124.2      2575      119.7      2605      119.2      2610
GR   116.7      2615      115.7      2625      116.2      2635      116.9      2645      119.2      2650
GR   118.7      2653      124.0      2665      126.0      2691      142.2      2945      155.1      3125
GR   163.7      3245      169.8      3545      175.5      3750

SB    1.25       1.5       2.5         0        12       4.5      2377      6.84      114.5      114.5
ET                                                    9.11                           1780       2665
X1  166065                                      30       30        30                  .1
X2                              1     133.5     136.5                                 .2
X3       10                                                          136.0      136.0
BT       17       200      155.0         0       555      143.5         0       800      128.1         0
BT     1150      137.5         0      1260      138.2         0      1620      138.3         0      2000
BT    138.4         0      2310      137.5         0      2481      136.5      133.5      2891      136.5
BT    133.5      2855      138.1         0      3140      149.7         0      3330      161.3         0
BT     3530      170.6         0      3830      181.8         0      3850      184.2         0      4240
BT    188.5         0

ET                                                    9.11                           1750       2685
X1  166765        26      2610      2650       200       280       280                  .2
GR    157.4       275     145.1       325      137.5       785      132.6      1125      133.5      1525
GR    126.1      1675     131.2      1865      133.5      2075      129.3      2315      127.3      2455
GR    124.8      2530     123.5      2565      119.7      2605      119.2      2610      116.7      2615
GR    115.7      2625     116.2      2635      116.9      2645      119.2      2650      119.7      2655
GR    124.0      2685     142.2      2945      155.1      3125      163.7      3345      169.8      3545
GR    175.5      3750

ET                                                    9.11                           0800       1280
X1  169000        25       977      1025      2735      2735      2735                  .3
GR    132        880       144       920       140       720       136       166       132       740
GR    128        810       124       820      122.9       955      121.9       977      118.4       985
GR    117.4      1000      118.4      1015      121.9      1025      123.8      1052       124      1060
GR    128        1130      132       1200       136      1320       139      1480       140      1470
GR    144.4      1750       141      2050      146.7      2300      154.3      2580      157.8      2700
1
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ET                                                    9.11                           0780       1780
X1  170540        25       805       855      1540      1540      1540                  .4
GR    191.6       200      182.4       330      180.1       470      162.9       665      124.0       790
GR    121.8       805      120.5       810      118.7       820      119.0       840      120.3       850
GR    121.8       855      123.5       870      125.8      1160      127.5      1350      133.0      1550
GR    130.6      1790      136.6      1950      139.5      2195      144.4      2540      142.3      2720
GR    145.0      2845      146.7      3100      154.3      2285      157.8      7495      156.4      3740

ET                                                    9.11                           565        1865
X1  174050        24      1775      1840      3510      2510      3510                  .5
GR    138.8       200      136.0       455      136.8       695      137.1       875      134.4      1230
GR    132.0      1420      132.1      1600      124.0      1745      123.4      1775      122.9      1780
GR    120.8      1800      120.4      1810      126.9      1820      121.9      1820      122.9      1835
GR    123.4      1940      124.0      1955      153.7      1970      153.6      2220      151.7      2410
GR    155.1      2570      168.7      2760      195.4      3030      193.4      3250

ET                                                    9.11                           1530       2030
X1  176130        25      1615      1675      2060      2060      2690                  .6
GR    174.6       200      168.0       385      158.2       650      157.8       850      157.7      1060
GR    155.2      1260      152.6      1390      126.0      1570      124.2      1615      123.7      1620
GR    121.8      1640      120.9      1650      121.0      1668      122.3      1670      123.8      1675
GR    124.3      1685      128.0      1740      134.1      1830      138.5      2060      142.5      2350
GR    141.6      2490      139.8      2660      139.8      2866      147.7      3120      149.0      3330

ET                                                    9.11                           0850       1450
X1  177470        19      1355      1415      1740      1340      1340                  .7
GR    158.3       365      153.1       515      129.5       725      129.0       885      128.9      1095
GR    129.5      1215      127.8      1335      125.1      1355      123.8      1365      120.9      1375
GR    119.1      1385      120.0      1395      121.1      1405      125.1      1415      128.0      1435
GR    146.1      1575      148.9      1770      152.7      2045      154.0      2245

ET                                                    9.11                           0850       1454
X1  177700        21      1756      1454      0235      0235      0235                  .2
X3       10                                                          141.3      143.0
GR    158.3       365      153.1       515      129.5       725      141.0       885      129.9      1095
GR    129.5      1215      129.2      1256      129.0      1325      125.1      1355      123.6      1365
GR    120.9      1375      119.1      1385      120.0      1395      121.1      1405      125.1      1415
GR    128.0      1435      138.7      1454      146.1      1575      148.9      1770      152.7      2045
GR    154.0      2245

SB    1.25       1.5       2.5         0        14       4.5      2872      3.06      119.5      119.5
ET                                                    9.11                           0850       1454
X1  177735                                      30       30        30                  .8
X2                              1     140.8     141.0                                 .9
X3       10                                                          141.5      145.1
BT       12       200      145.8         0       605      141.5         0       800      141.0         0
BT     1850      142.8         0      1256      144.6      140.8      1275      144.6      140.8      1380
BT    144.6      140.8      1454      144.6      140.8      1630      144.8         0         0      1820      145.1
BT        0      2085      148.4         0      2430      148.8         0
1
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NH        5       0.38      1098       0.12      1355      0.055      1415       0.12      1575       0.38
NH     2245
ET                                                    9.11                           0850       1550
X1  177910        19      1365      1415       197       197       197                  .9
GR    158.3       365      153.1       515      129.5       725      141.0       885      128.9      1095
GR    129.5      1215      127.8      1335      125.1      1355      123.8      1365      120.9      1375
GR    119.1      1385      120.0      1395      121.1      1405      125.1      1415      128.0      1435
GR    146.1      1575      148.9      1770      152.7      2045      154.0      2245

NH       0.12       0.12      0.055                                                     .10
ET                                                    9.11                           0840       2440
X1  180150        23       715       765      2480      1900      2630                  .1
```

```
GR   171.0       200      181.5       330      183.1       555      128.0       695      126.2       715
GR   125.2       720      122.7       730      121.8       740      123.3       750      125.0       760
GR   126.2       785      128.0       810      129.0       830      129.5      1115      130.7      1410
GR   129.8      1660      130.7      1860      132.9      2130      132.0      2299      136.2      2570
GR   135.1      2760      146.4      3020      152.5      3160

ET                                                    9.11                           1560       3060
X1  183479        18      2904      3030      2129      2729      2729                  .2
GR    156        800       140      1100       139      1200       137      2400      126.5      2904
GR   126.5      2965      125.5      2970      123.0      2985      121.3      2990      123.6      3000
GR   125.3      3010      126.5      3015       130      3030       132      3080       140      3120
GR    142       3150       144      3200       148      3500

ET                                                    9.11                           1560       3120
X1  183529         0         5         3        50        50        50                  .3

ET                                                    9.11                           1560       3120
X1  183533        18      2904      3030         4         4                          .4
GR    156        800       140      1100       139      1300       137      2400      126.5      2904
GR   126.5      2965      125.5      2970      123.0      2980      121.3      2990      123.6      3000
GR   125.3      3010      126.5      3015       130      3020       132      3080       140      3120
GR    142       3150      144.0      3300       148      3500

ET                                                    9.11                           1560       3120
X1  183534         0         0         0         1         1         1                  .5

ET                                                    9.11                           1560       3120
X1  183535         0         0         0         1         1         1                  .6

ET                                                    9.11                           1560       3120
X1  183537         0         0         0         2         2         2                  .7

ET                                                    9.11                           1560       3120
X1  183540         0         0         0         3         3         3                  .8

ET                                                    9.11                           1560       3120
X1  183545         0         0         0         5         5         5                  .9
1
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ET                                                    9.11                           1560       3120
X1  183555         0         0         0        10        10                          .10

ET                                                    9.11                           1560       3120
X1  183575         0         0         0        20        20                          .11

ET                                                    9.11                           1560       3120
X1  183650         0         0         0      0275      0275                          .12

ET                9.11      9.11      9.11      9.11                9.11      1600       2600
ET                                                    9.11                           1750       2200
X1  184810        16      2150      2255      0960      0960      0960                  .13
GR    146.0         0       144.0       170       142.0       490       140.0       555       136.0       765
GR    126.8       860       136.0      1750       134.0      1860       132.0      1985       128.0      2150
GR    122.3      2170      122.5      2230       128.0      2255       132.0      2300       134.0      2360
GR    148.0      2480

ET                9.11      9.11      9.11      9.11                9.11      1850       2350
ET                                                    9.11                           1875       2325
X1  185135         0         0         0      0295      0295      0295                  .15

ET                                                    9.11                           1775       2011
X1  185255        19      1775      2011       150       150       150                  .16
X3       10                                                                    148.0      149.0
GR    146.0         0       144.0        85       142.0       180       140.0       245       138.0       455
GR    136.0       550       136.0      1440       134.0      1550       132.0      1675       129.6      1775
GR    128.0      1840      122.3      1860       122.5      1920       128.0      1945       132.0      1990
GR    132.7      2011      134.0      2050       148.0      2170       158.0      2480

SB    1.25       1.5       2.5         0        84       5.5      4106      3.78      124.0      124.0
ET                                                    9.11                           1775       2011
X1  185345                                      90       90        90                  .2
X2                              1     148.5     151.4                                 .3
X3       10                                                                    151.9      152.5
BT       17       470      154.4         0       140      151.7         0       960      151.4         0
BT     1190      151.7         0      1420      151.9         0      1510      152.0         0      1680
BT    152.0         0      1775      152.0      148.5      1900      152.0      148.5      2011      152.0
BT    148.5      2160      152.0         0      2350      152.1         0      2550      152.9         0
BT     2850      154.5         0      3030      156.5         0      3240      157.5         0      3500
BT    158.7         0

ET                9.11      9.11      9.11      9.11                9.11      1850       2350
ET                                                    9.11                           1900       2200
X1  185495        16      2150      2255       150       150       150                  .17
GR    146.0         0       144.0       170       142.0       490       140.0       555       136.0       765
GR    126.8       860       136.0      1750       134.0      1860       132.0      1985       128.0      2150
GR    122.3      2170      122.5      2230       128.0      2255       132.0      2300       134.0      2360
GR    148.0      2480
1
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ET                9.11      9.11      9.11      9.11                9.11      1200       2750
ET                                                    9.11                           1480       2430
X1  185670        18      1940      2085      0235      0235                          .18
GR    147.6       885       146.4      1105       142.3      1285       136.8      1475       130.5      1675
GR    128.6      1750      128.0      1940       125.5      1955       125.8      1985       126.6      2015
GR    127.1      2035      128.8      2085       132.0      2125       133.1      2185       135.1      2455
GR    142.2      2695      160.2      2859       171.0      3045

ET                                                    9.11                           1100       2100
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X1  182630      21      1500    1565    1660    1800    1860
GR    165.5     200     153.5    270    159.5    410    163.8     600    183.5     760
GR    167.2     830     140.0   1000    171.8   1650    131.8    1110    132.8    1190
GR    130.4    1410     124.5   1500    123.5   1510    128.5    1520    125.5    1530
GR    124.6    1540     125.4   1550    126.2   1560    129.5    1570    129.5    1580
GR    130.0    1610     134.2   1910    141.4   2170    148.0    2420    149.5    2700
GR    157.8    2920     162.9   3100

NH       4       .5      1330     12    2000     .055    2080     .12    2690
ET                                                 9.11                    1329     2120
X1  188770      20      2000    2040    1140    1140    1140
GR    154      700      141      760     140    1130     136    1170     132     1330
GR    132     1460     132.8    1680     132    1670     130    2000     125     2010
GR    123.5   2040      125     2070     130    2080     132    2229     136     2530
GR    140     2570      144     2600     148    2610     152    2630     156     2690

NH       5       .6      1800     .12    2000     .055    2070     .12    2370      .6
NH    2500
ET                                                 9.11                    1800     2480
X1  189700      15      2000    2070    8700    1000    0930
GR    152     1140      140     1180     136    1210     132    1310     132     1860
GR    132     1890      138     2000     125    2010    122.7    2035     125     2060
GR    130     2070      132     2120     132    2370     136    2400     156     2500

NH       5       .7      2380     .12    2460     .055    2520     .12    2580      .7
NH    4605
ET                 9.11    9.11    9.11    9.11                    9.11    2360     2600
ET                                                 9.11                    2390     2598
X1  190174      36      2460    2520     474     474     474                -1.8
GR    174.5     120     172.2     290    171.9     490    168.5     675    164.1     860
GR    156      985      140     1160     132.5   1280     132.5   2270    133.5    2380
GR    132.6   2403      130.4   2460     129.4   2465     127.9   2470    126.6    2480
GR    125.9   2490      126.0   2497     126.8   2500     127.9   2510    128.9    2515
GR    130.4   2520      132.5   2540     132.5   2615     130.4   2630    130.4    2655
GR    132.0   2720      133.8   3010     141.1   3210     141.8   3370    150.2    3710
GR    159.8   3970      162.8   4190     168.8   4350     173.7   4605

SB       1      1.5       2.5      0       74      .1    1981      .76    122.0    122.0
ET                                                 9.11                    2403     2497
X1  190496                                     32      32      32
X2                         1     144.4    143.2
X3       10                                                  148.0    148.5
BT       16      200      155.2     0      740    151.6     0       1335    147.7       0
BT     1920    147.2        0    2403    147.6    144.4    2450    147.6    144.4    2497
BT   147.6     144.4     2680    149.0       0     2950    150.0       0    3298    151.8
BT        0     3500     152.0       0    3750    154.6       0    4045    156.0       0
BT     4445     160.2        0    4830    162.7       0    5059    163.2       0

NH       5       .9      2380     .12    2403     .055    2520     .12    2540      .9
NH    4605
ET                                                 9.11                    2403     2520
X1  190550      34      2403    2520      54      54      54                -2.0
X3       10                                                      148      148
GR    174.5     120      172.2     290    171.9     490    168.5     675    164.1     860
GR    156.0     985      140.0    1160    132.5    1280    132.5    2270    133.5    2380
GR    132.6    2403      130.4    2460    129.4    2465    127.9    2470    126.6    2480
GR    125.9    2490      126.0    2497    126.8    2500    127.9    2510    128.9    2515
GR    130.4    2520      132.5    2540    132.5    2615    130.4    2630    130.4    2655
GR    132.0    2720      133.8    3010    141.1    3210    141.8    3370    150.2    3710
GR    159.8    3970      162.8    4190    168.8    4350    173.7    4605

ET                                                 9.11                    2403     2504
X1  190604      36      2337    2504      54      54      54                -1.8
X3       10                                                  147.2    147.4
GR    174.5      89      172.2     290    171.9     450    168.5     639    164.1     820
GR    156.0     845      140.0    1120    132.5    1240    132.5    1952    132.5    2058
GR    132.5    2152      132.5    2159    132.5    2237    130.4    2250    126.8    2420
GR    126.4    2425      127.9    2438    126.6    2440    125.9    2450    126.8    2460
GR    127.9    2470      128.9    2475    130.4    2480    132.5    2504    132.5    2575
GR    130.4    2590      130.4    2615    133.0    2680    133.8    2970    141.1    3170
GR    141.8    3230      150.2    3670    159.8    3930    163.8    4150    168.8    4310
GR    173.7    4565

SB       1.25    1.5       2.5      0       69      4.7    2649      1.86    125.0    125.0
ET                                                 9.11                    2337     2504
X1  190636                                     32      32      32
X2                         1     150.3    141.5
X3       10                                                  148.0    148.4

ET        28      236     158.3       0     660     154.3       0     915    147.9       0
BT      1248    147.8        0    1560    147.5       0    1698    148.0       0    2010
BT     150.1        0    2270     153.0       0    2327     153.8    150.3    2458     153.8
BT     150.3     2584    153.9     158.3    2625     153.1       0    2910    148.0       0
BT      3145    147.9        0    3682     152.0       0    3905     151.9       0    4190
BT     156.7        0    4470     164.5       0    4700     169.5       0    4985     174.2

NH       5       .1      2685     .12    2765     .059    2825     .12    2920      .7
NH    4918
ET                 9.11    9.11    9.11                                    2513     3047
ET                                                 9.11                    2600     2978
X1  190820      36      2765    2825     184     184     184                -0.7
GR    174.5     425      172.2     595    171.9     795    168.5     980    164.1    1165
GR    156.9    1290      140.0    1465    132.5    1585    132.5    2337    132.5    2403
GR    132.5    2497      132.5    2504    132.5    2575    132.5    2685    132.5    2765
GR    129.4    2770      127.9    2775    126.6    2785    125.9    2795    126.8    2805
GR    127.9    2815      128.9    2820    130.4    2825    132.5    2845    132.5    2920
GR    130.4    2935      130.4    2960    133.0    3025    133.8    3215    141.1    3515
GR    141.8    3675      150.2    4015    159.8    4275    163.8    4495    168.8    4655
GR    173.7    4918

NH       5       .5      2575     .12    2765     .055    2825     .12    3025      .5
NH    4918
ET                 9.11    9.11    9.11                                    2400     3100
ET                                                 9.11                    2450     3050
X1  190920      36      2765    2825     100     100     100
GR    174.5     425      172.2     595    171.9     795    168.5     980    164.1    1165
GR    156.0    1290      140.0    1465    132.5    1585    132.5    2337    132.5    2403
GR    132.5    2497      132.5    2504    132.5    2575    132.5    2685    132.5    2765
GR    129.4    2770      127.9    2775    126.6    2785    125.9    2795    126.8    2805
GR    127.9    2815      128.9    2820    130.4    2825    132.5    2845    132.5    2920
GR    130.4    2935      130.4    2960    133.0    3025    133.8    3215    141.1    3515
GR    141.8    3675      150.2    4015    159.8    4275    163.8    4495    168.8    4655
GR    173.7    4918

ET                 9.11    9.11    9.11                                    2100     3500
ET                                                 9.11                    2000     3400
MC      0.12     0.12     0.055
X1  191500          0       0       0     580     580     580                0.2
QT        1       5620    11000    14700    25100    14300    14300    5080
ET                                                 9.11                    1800     3280
X1  193840      29      3120    3180    3000    2340    2340
GR    149.8     200     142.8     525    144.8     655    142.6     820    144.4     935
GR    142.7    1100     140.1    1225    142.5    1420    142.3    1580    141.9    1765
GR    140.2    1970     138.2    2200    135.4    2495    133.8    2770    133.1    3095
GR    131.3    3120     129.9    3125    128.2    3130    126.4    3140    126.3    3150

                                                                                                    PAGE  26

GR    128.4    3160     129.5    3165    131.3    3170     148.0    3180     160.0    3275
GR    172.2    3305     174.5    3475    175.1    3640

ET                                                 9.11                    1550     2900
X1  195378      27      2680    2730    1538    1538    1538                -0.6
GR    149.3     150     150.0     380    146.1     750    142.3     800    144.7    1070
GR    142.5    1290     143.5    1540    142.6    1880    135.5    2240    136.8    2395
GR    133.5    2580     132.0    2650    131.9    2680    130.2    2685    128.4    2680
GR    127.7    2700     126.9    2710    128.0    2720    129.9    2725    131.9    2730
GR    132.0    2760     133.5    2810    146.5    3050    152.0    3250    155.2    3430
GR    160.7    3620     161.2    3760

MC      0.12     0.12     0.055
ET                                                 9.11                    1500     2378
X1  195504      29      2671    2779     126     126     126                -.6
X3       10                                                        143.5    148.0
GR    149.3     150     150.0     380    146.1     750    142.3     800    144.7    1070
GR    142.5    1290     143.5    1540    142.6    1880    135.5    2240    136.8    2395
GR    133.5    2540     132.4    2631    132.0    2650    131.9    2680    128.2    2685
GR    128.4    2690     127.7    2700    126.9    2710    128.0    2720    129.9    2725
GR    131.9    2730     132.0    2760    132.6    2779    133.9    2810    146.5    3050
GR    152.0    3250     155.2    3430    160.7    3620    161.2    3760

SB      1.25     1.5      2.5      0       31      3.1    1710      3.64    126.5    126.5
ET                                                 9.11                    1500     2779
X1  195536                                     32      32      32                 .1
X2                         1     144.9    143.7
X3       10                                                        144.2    148.4
BT       16      200      147.8       0     515    145.5       0     850    145.2       0
BT     1100    144.0        0    1330     143.7       0    1620     143.8       0    1970
BT    145.1        0    2320     146.0       0    2631     147.9    144.9    2705     147.9
BT     144.9     2719    147.9     144.9    2980     149.2       0    3250     155.0       0
BT     3400     156.2        0    3690     162.8       0    3840     166.2       0

ET                                                 9.11                    1380     2900
X1  195770      27      2680    2730     234     234     234
GR    149.3     150      150.0     380    146.1     550    142.3     800    144.7    1070
GR    142.5    1290     143.5    1540    142.6    1880    135.5    2240    136.8    2395
GR    133.5    2580     132.0    2650    131.9    2680    130.2    2685    128.4    2690
GR    127.7    2700     126.9    2710    128.0    2720    129.9    2725    131.9    2730
GR    132.0    2760     133.5    2810    146.5    3050    152.0    3250    155.2    3430
GR    160.7    3620     161.2    3760

MC      0.12     0.12     0.055
ET                                                 9.11                    1550     2600
X1  199930      23      2360    2428    3500    4200    4200
GR    147.8     200      150.2     620    145.5     870    142.8    1450    146.9    1870
GR    135.6    2345     133.8    2360    131.1    2385    129.9    2370    128.9    2380
GR    129.2    2390     129.3    2408    129.5    2410    131.3    2415    133.8    2420
GR    134.0    2430     134.5    2520    138.8    2620    143.2    2970    159.5    3140
GR    164.2    3270     165.8    3458    161.8    3710
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ET                                                    9.11                                    900         3200
X1  209680          25        1870        2030        4000        2000        9690
GR      156         420         152         558         148         640         144         700         140         720
GR      140        1600       140.5        1800         140        1860         138        1920         135        1970
GR    122.5        1975       111.6        1980       120.5        1990       130.0        2000       121.0        2010
GR    122.5        2020       133.0        2025         135        2030         138        2080       139.5        2600
GR      148        3500         144        3650         140        3730         152        3750         156        4350

ET                                                    9.11                                   1100         3150
X1  210600          25        1970        2030        3940        0940        6940                     1.0
GR      156         380         152        1050         144        1120         140        1170         142        1540
GR    143.5        1750         142        1900         140        1960       135.1        1970       122.6        1975
GR    131.7        1980       130.6        1990       120.1        2000       131.1        2010       132.6        2020
GR    133.1        2025       135.1        2030         144        2070         146        2150       146.2        2320
GR      148        3100         152        3120         156        3200

ET                                                    9.11                                   1600         2500
X1  211350          21        2210        2265         750         750         750
GR    155.7        1000         152        1380         148        1470         146        1550         145        1600
GR    144.4        2000       144.2        2140         139        2210       133.5        2220       131.8        2226
GR    130.6        2229       131.8        2240       130.0        2245       133.5        2254       139.0        2265
GR      144        2300         146        2400         148        2750         152        2980         156        3220
GR      160        3500

ET                                                    9.11                                   0950         1550
X1  211580          20        1405        1470         150         150         150
GR    161.3         350       160.8         590       150.5         750       145.1        1040       144.8        1258
GR    142.5        1380       136.1        1405       134.1        1410       132.4        1420       131.9        1430
GR    130.7        1440       131.1        1450       132.1        1460       133.6        1465       136.1        1478
GR    141.5        1480       151.3        1580       155.0        1700       155.8        1920       157.2        2190

MC      0.12        0.12       0.055
ET                                                    9.11                                   1000         1550
X1  211626          22        1375        1534         126         126         126
X3      10                                                                    149.3       149.3
GR    161.7         397       160.8         637       150.5         797       145.1        1067       144.8        1297
GR    142.0        1375       140.0        1432       136.1        1492       134.1        1497       132.4        1461
GR    131.9        1477       130.7        1487       131.1        1497       132.1        1507       133.6        1512
GR    136.1        1517       139.4        1534       140.0        1537       151.7        1627       155.0        1747
GR    155.8        1967       157.2        2237

SR      1.25         1.5        2.5          0          82         4.6        1689         .45       121.5       121.5
ET                                                    9.11                                   1050         1550
X1  211654                                              28          28          29
X2                                1       147.8       150.8
X3      10                                                                    150.8       151.0
RT      12         200        161.8          0         540       154.8          0         770       151.4          0
BT    1605       150.8          0        1220       151.1          0        1375       150.8       147.8       1435
BT    150.8       147.8       1534       150.8       147.8       1590       151.0          0        1900       152.9
RT       0        2170       156.1          0        2380       157.1          0
1
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ET                                                    9.11                                   1050         1550
X1  211880          20        1405        1470         226         226         226
GR    161.3         258       160.8         598       150.5         750       145.1        1040       144.8        1258
GR    142.5        1380       136.1        1405       134.1        1410       132.4        1420       131.9        1430
GR    130.7        1440       131.1        1450       132.1        1460       133.6        1465       136.1        1478
GR    141.5        1480       151.3        1580       155.0        1700       155.8        1920       157.2        2190

MC      0.12        0.12       0.055
ET                                                    9.11                                   1040         1940
X1  214360          27        1140        1240        2480        2480        2480
GR    168.2         200       165.0         350       163.0         550       158.7         710       151.1         955
GR    138.8        1110       137.2        1140       133.9        1145       133.3        1150       132.7        1160
GR    122.4        1170       132.1        1180       132.0        1190       132.3        1200       133.2        1210
GR    133.7        1220       134.2        1230       134.3        1235       137.2        1240       139.5        1260
GR    140.9        1370       141.5        1590       143.1        1850       153.0        2070       156.3        2220
GR    160.9        2490       175.8        2560

ET                                                    9.11                                   1490         3600
X1  216920          28        1320        1589        2560        2560        2560
GR    156.4         200       161.0         320       166.9         405       166.0         525       159.2         720
GR    153.9         920       147.1        1260       143.5        1480       138.1        1520       135.0        1525
GR    124.1        1530       133.6        1540       132.9        1550       134.1        1560       134.6        1570
GR    135.1        1590       138.1        1589       140.0        1630       145.8        1690       144.9        1950
GR    144.3        2240       144.2        2660       144.1        2958       143.8        3338       143.6        3780
GR    142.1        3980       141.8        4040       145.8        4140       152.0        4500

NN        4        0.38       1489        0.12        1520       0.055        1589        0.12        4500
ET                                                    9.11                                   1490         4000
X1  217120          26        1520        1589         200         200         200
GR    156.4         200       161.0         320       166.9         405       166.0         525       159.2         720
GR    153.8         920       147.1        1260       143.5        1480       138.1        1520       135.0        1525
GR    124.1        1530       133.6        1540       132.9        1550       134.1        1560       134.6        1570
GR    135.1        1590       138.1        1589       140.0        1630       145.8        1690       144.9        1950
GR    144.3        2240         145        3000         146        4000         148        4500         155        5000
GR      160        5200

MC      0.12        0.12       0.055
ET                                                    9.11                                   1490         4000
X1  217390          26        1530        1589         270         270         270
X1      10                                                                    148.8       145.6
GR    156.4         200       161.0         320       166.9         405       166.0         525       159.2         720
GR    153.8         920       147.1        1260       143.5        1480       138.1        1520       135.0        1525
GR    124.1        1530       133.6        1540       132.9        1550       134.1        1560       134.6        1570
GR    135.1        1590       138.1        1589       140.0        1630       145.8        1690       144.9        1950
GR    144.3        2240         145        3000         146        4000         148        4500         155        5000
GR      160        5200

SR        1          1.5        2.5          0          42         .1          561        1.11       136.0       136.0
ET                                                    9.11                                   1490         4000
1
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X1  217410                                                          30          20          20
X2                                    1       148.8       141.6
X3      10                                                                    147.0       142.1
RT      18         200        156.4          0         320       161.0          0         405       166.9          0
BT     525       166.0          0         720       159.2          0         920       153.8          0        1260
BT    147.1          0        1410       148.5          0        1530       148.9       146.6       1589       148.9
BT    146.6       1690       145.8          0        1950       144.8          0        2240       144.3          0
BT     3000         145          0        4000         146          0        4500         148          0        5000
RT      155          0        5200         160

ET                                                    9.11                                   1490         4000
X1  217636          26        1520        1589         226         226         226
GR    156.4         200       161.0         320       166.9         405       166.0         525       159.2         720
GR    153.8         920       147.1        1260       143.5        1480       138.1        1520       135.0        1525
GR    124.1        1530       133.6        1540       132.9        1550       134.1        1560       134.6        1570
GR    135.1        1590       138.1        1589       140.0        1630       145.8        1690       144.8        1950
GR    144.3        2240         145        3000         146        4000         148        4500         155        5000
GR      160        5200

MC      0.12        0.12       0.055
ET                                                    9.11                                   1330         2300
X1  220520          22        1485        1530        2884        2884        2884
GR    163.7         200       165.2         270       169.0         460       168.2         160       161.5        1210
GR    154.3        1255       140.6        1468       139.1        1485       137.3        1490       135.3        1500
GR    136.1        1510       135.6        1520       137.1        1525       139.1        1530       142.0        1565
GR    145.2        1810       147.2        1960       147.9        2180       152.5        2315       154.6        2458
GR    157.2        2670       157.2        2895       154.2        3200       154.0        3290       154.0        3450
GR      154        3630         155        3900       157.3        4910       162.1        5050       173.5        5285

ET                  9.11        9.11        9.11                                               3000         4500
ET                                                    9.11                                   3400         3850
X1  222812          21        3640        3700        2292        2108        2292
GR      165        1500         160        1900         152        2050         149        2830         148        3400
GR    145.5        3600       140.5        3630       138.7        3635       137.6        3640       137.1        3650
GR    137.0        3660       136.5        3670       137.0        3680       137.6        3690       138.5        3695
GR    140.5        3700       144.0        3720         148        3750         150        3900         152        4000
GR      160        4150                                                                               3500         3750

ET                  9.11        9.11        9.11                                               3400         4500
ET                                                    9.11                                   3500         3150
X1  223312          0           0           0          500         500         500
MC      0.12        0.12       0.055
ET                                                    9.11                                   3579         3741
X1  223445          27        3579        3741         133         133         133
X3      10                                                                    155.0       155.0
GR    174.8         30        173.1         340       172.8         590       163.2         830       156.0        1100
GR    150.7        1410       147.3        1960       145.0        2310       145.3        2740       146.7        3150
GR    144.3        3579       144.0        3600       140.5        3630       138.7        3635       137.6        3640
GR    137.1        3650       137.0        3660       136.5        3670       137.0        3680       137.6        3690
GR    138.5        3695       140.5        3700       144.0        3720       157.0        3741       165.7        3755
GR    170.4        3940       175.0        4140
1
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SR      1.25         1.5        2.5          0          29          3          1511        3.75       138.5       138.5
ET                                                    9.11                                   3579         3741
X1  223475                                                          30          30          30
X2                                    1       154.4       156.8
X3      10                                                                    157.3       159.0
RT      18         200        171.1          0         490       173.9          0         740       171.2          0
BT     960       165.9          0        1310       158.2          0        1730       157.1          0        2070
BT    156.9          0        2440       156.8          0        2610       156.8          0        2865       157.8
BT       0        3130       157.3          0        3490       157.4          0        3579       157.8       154.4
BT     3660       157.8       154.4        3741       158.5       154.4        3755       165.7          0        3940
RT    170.4          0        4140       175.0          0

ET                  9.11        9.11        9.11                                               3350         3900
ET                                                    9.11                                   3350         3725
X1  223620          25        3640        3700         145         145         145
GR    174.8         30        173.1         340       172.8         590       163.2         830       156.0        1100
GR    150.7        1410       147.3        1960       145.0        2310       145.3        2740       146.7        3150
GR    145.5        3600       140.5        3630       138.7        3635       137.6        3640       137.1        3650
GR    137.0        3660       136.5        3670       137.0        3680       137.6        3690       138.5        3695
GR    140.5        3700       144.0        3720       165.7        3755       170.4        3940       175.0        4140

MC      0.12        0.12       0.055
ET                  9.11        9.11        9.11                                               2700         3900
ET                                                    9.11                                   2700         3725
X1  224000          0           0           0          380         380         380
ET                                                    9.11                                   3000         4300
X1  229880          30        2960        3020        4200        5080
GR    166.8         200       162.1         600       162.4         920       158.2        1240       152.1        1420
GR    151.7        1590       147.8        1995       151.2        2170       156.2        2560       152.8        2815
GR    144.8        2940       142.3        2960       139.8        2965       139.7        2970       137.8        2980
GR    137.3        2990       137.8        3068       138.3        3010       139.3        3015       142.3        3020
GR    148.0        3030       152.7        3410       154.6        4005       157.3        4395       161.5        4480
GR    162.2        5040       165.2        5405       171.9        5720       178.4        5900       173.5        6030
ET                                                    9.11                                   0975         1975
X1  234920          24        1885        1940        5000        5840        5840
GR    165.8         315       166.8         285       164.5         470       157.7         675       152.1         815
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GR   151.5     920    150.3    1190     153.6    1375    150.5    1545    148.7    1805
GR   148.0    1875    144.8    1895     141.8    1800    141.0    1805    140.8    1915
GR   140.8    1925    141.1    1935     144.8    1940    148.0    1955    157.1    2095
GR   164.2    2205    177.4    2325     185.7    2470    188.6    2815

NC     0.12     0.12     0.055
ET                                               9.11                      0963     1963
X1  225026       26     1859     1962      106     106      106
X2       10                                                      154.8    159.0
GR   165.0     175    166.0     285     164.5     470    157.7     675    153.1     815
GR   151.5     870    150.3    1180     153.6    1375    150.5    1545    148.7    1805
GR   140.1    1859    148.0    1975     144.8    1895    141.8    1900    141.8    1905
GR   140.8    1915    140.8    1925     141.1    1935    144.8    1940    148.0    1955
GR   148.5    1967    157.1    2095     164.2    2205    177.4    2225    185.7    2470
GR   188.6    2615
1
     16JUL01     15:31:28                                                                PAGE  31

XE     1.25     1.5      2.5      0       38       3.4     834      2.26     144.0    144.0
ET                                               9.11                      0963     1963
X1  235054                                 28       28      28
X2                        1      156.8    155.4
X3       10                                                      156.8    166.3
BT       14      200    163.5        0      530     160.4        0      800    157.5        0
BT     1210      155.4        0     1545     157.0        0     1780    158.6        0     1859
BT    159.8     156.8     1915    159.8     156.8     1963    159.8    136.8     2090    163.0
BT        0     2280    170.8        0     2325    177.4        0     2470    185.7        0
BT     2815     188.6        0

ET                                               9.11                      0975     1975
X1  235156       24     1885     1940      102     102      102
GR   165.8     175    166.0     285     164.5     470    157.7     675    153.1     815
GR   151.5     930    150.3    1180     153.6    1375    150.5    1545    148.7    1805
GR   148.0    1875    144.8    1895     141.8    1900    141.0    1905    140.8    1915
GR   140.8    1925    141.1    1935     144.8    1940    148.0    1955    157.1    2095
GR   164.2    2205    177.4    2325     185.7    2470    188.6    2815

ET                                               9.11                      1083     2385
X1  237560       23     2325     2360     2000     2100     2404
GR   167.2     200    165.8      365     166.1      530    161.6      700    155.7      890
GR   156.5    1070    155.0     1290     154.7     1490    157.8     1670    155.5     1990
GR   154.8    2250    148.8     2310     146.1     2325    144.1     2330    142.4     2340
GR   141.1    2350    143.4     2355     146.1     2360    148.0     2380    188.8     2460
GR   200.8    2660    197.4     2928     184.1     3110

ET                                               9.11                      1558     2950
X1  240010       20     2895     2925     2450     2450     2450
GR   181.7     280    173.7      440     172.5      680    172.2      890    156.8     1210
GR   156.9    1400    156.8     1680     156.8     1815    154.1     2160    156.2     2405
GR   153.2    2650    152.4     2805     152.0     2860    147.8     2895    145.8     2900
GR   144.8    2910    144.1     2915     144.8     2920    147.8     2925    152.0     2945
GR   155.0    2980    158.2     3120     163.5     3310    175.4     3490    187.0     3580
GR   199.0    3705    199.7     3920     195.2     4170

ET                                               9.11                      1550     2950
X1  242510        0        0        0     2500     2500     2500                1.0
ET                                               9.11                      2750     4150
X1  243920       31     3295     3335     1410     1410     1410
GR   195.5     200    182.7      435     174.6      700    167.9      940    165.0     1150
GR   166.2    1510    164.9     1910     164.3     2230    162.3     2500    155.2     2800
GR   152.5    3020    152.0     3220     149.6     3270    149.0     3285    146.8     3290
GR   146.5    3300    145.6     3310     146.8     3320    147.1     3330    148.4     3335
GR   149.6    3340    151.2     3390     151.8     3830    158.0     4300    165.2     5000
GR   171.5    5610    181.5     5770     192.8     5935    207.5     6130    211.3     6270
1
     16JUL01     15:31:28                                                                PAGE  32

ET                    9.11     9.11     9.11     9.11                      2500     3590
ET                                               9.11                      3100     4600
X1  245070       21     3295     3335     1150     1150     1150
GR   180     1100      176     1160      172     1530      168     1730      164     2280
GR   160     2530      160     2850      158     3230    151.6     3295    148.1     3300
GP   148.1    3310    147.8     3320    149.2     3330    151.6     3335      152     3400
GR   152     4750      156     4820      158     5000      160     5320      176     5482
GR   180     5590

ET                    9.11     9.11     9.11     9.11                      3700     4450
ET                                               9.11                      2150     3600
X1  246700       23     3295     3335     1630     1630     1630
GR   180      390      176      560      172      610      168      780      164     1530
GR   160     1600      160     2700     160.3     2960      160     3250    152.8     3295
GR   150.3    3300    149.3     3310     148.0     3320    150.4     3330    152.8     3335
GP   152      3360      156     3400      158     3600      160     4150      164     4200
GR   168      4280      172     4400      180     4450

ET                                               9.11                      3200     4400
X1  248150       22     3295     3335     1450     1450     1450
GR   180     1770      176     1830      172     1900    168.5     2500      168     3100
GR   164     3200      160     3280     154.1     3295    151.8     3300    150.6     3310
GR   149.3    3320    151.7     3330     154.1     3335      156     3390      158     3470
GP   158.8    3620      160     4460      164     4530      166     4620      172     4710
GR   176     5430      180     5600

ET                                               9.11                      1000     2700
X1  249830       21     2895     2931     1668     1668     1668
GP   163.1     200    176.5      475     164.2      755    160.2     1068    162.1     1480
GP   162.5    1840    162.8     2840     160.8     2888    155.3     2895    152.8     2924
GR   151.8    2110    156.5     2120     152.8     2130    155.3     2135    159.3     2170
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GR   160.0     2190     164.0     2370     168.0     2400     171.7     2620     171.6     2840
GR   172.7     3065

ET                                               9.11                      1000     2350
X1  251060       18     1030     1065     1230     1230     1230
GR   182.5      180      171.1      420      175.0      650     164.8      920     160.0     1010
GR   158.1     1020     154.1     1035     151.6     1050     152.2     1060     154.1     1080
GR   156.1     1085     160.0     1110     161.7     1250     161.4     1490     161.7     1885
GR   160.9     2225     160.2     2600     172.5     2995     175.5     3325

NC     0.12     0.12     0.055
ET                                               9.11                      1000     2500
X1  251227       21     1028     1188      167      167      167
X2       10                                                      166.5    166.0
GR   182.5      180      171.1      420      175.0      650     164.8      920     160.0     1010
GR   158.0     1020     156.1     1030     154.1     1035     151.6     1050     152.2     1060
GR   154.1     1080     156.1     1085     158.3     1100     160.0     1110     161.7     1250
GR   161.4     1490     161.7     1885     160.9     2225     160.2     2600     172.5     2995
GR   175.5     3325
1
     16JUL01     15:31:28                                                                PAGE  33

XE     1.25      1.5      2.5        0       49      2.0      782     1.05     153.5    153.5
ET                                               9.11                      1000     2500
X1  251253                                              26       26      26
X2                        1      166.4    164.8
X3       18                                                      166.7    165.1
BT       14      200    180.2        0      350     177.3        0      545    172.9        0
BT      835     166.2        0     1020     168.4     166.4     1100    168.4    166.4     1225
BT   168.1        0     1430     167.0        0     1560     166.1        0     1900    164.7
BT     2450     172.6        0     2650     166.0        0     3135     170.4        0

ET                                               9.11                      1000     2500
X1  251360       19     1030     1085      107      107      107
GR   182.5      180      171.1      420      175.0      650     164.8      820     160.0     1010
GR   156.1     1030     154.1     1035     151.6     1050     152.2     1060     154.1     1080
GR   156.1     1085     160.0     1110     161.7     1250     161.4     1490     161.7     1885
GR   160.9     2225     160.2     2600     172.5     2995     175.5     3325

ET                                               9.11                      1000     2500
X1  251560        0        0        0      208      200      200
ET                                               9.11                      1120     3120
X1  253550       18     3030     3085     0800     0800     1990
GR   180      550      172      780      166      1000     165.1     2000     165.1     2780
GR   164     3000     161.0     3015     157.1     3030     155.1     3035     152.6     3050
GR   153.2    3060     155.1     3080     157.1     3085     161.8     3100      164      3180
GR   168      3230      176      3470      180      3780

NC     0.12     0.12     0.055
ET                                               9.11                      2900     3300
X1  256530       24     3090     3130     2980     2980     2980
GR   206.8      200      198.6      365      190.6      615     186.1      940     183.1     1200
GR   180.6     1450     176.8     1855     175.8     2275     175.3     2570     167.2     2955
GR   168.8     3010     158.0     3090     155.0     3095     154.0     3100     152.7     3110
GR   153.8     3120     155.2     3125     158.6     3130     160.0     3155     174.2     3435
GR   182.5     3800     196.4     4160     212.4     4605     218.3     5025

ET                                               9.11                      2225     3725
X1  261680       27     3640     3780     5150     5150     5150
GR   188.3      200      195.0      410      185.9      715     179.2     1035     176.5     1415
GR   174.6     1705     188.0     2155     168.2     2490     169.2     2810     168.4     3080
GR   171.8     3350     168.8     3465     160.8     3615     159.2     3640     156.7     3645
GR   156.1     3650     155.2     3660     154.8     3670     155.3     3680     156.7     3695
GR   159.2     3700     160.0     3725     198.4     3900     222.4     4110     222.4     4280
GR   221.2     4630     228.3     4740

ET                                               9.11                      1800     2200
X1  264030       23     1840     1905     3150     3150     3150
GR   197.8      200      199.6      405      196.1      520     194.5      600     188.0      855
GR   186.8     1180     186.9     1425     182.3     1615     184.0     1815     180.9     1940
GR   176.4     1845     176.8     1860     176.4     1870     176.8     1880     178.4     1900
GR   180.9     1905     184.0     1925     171.5     2185     182.3     2540     204.6     2870
GR   211.4     3090     219.3     3250     213.4     3610
1
     16JUL01     15:31:28                                                                PAGE  34

ET                                               9.11                      1100     1390
X1  265780       20     1225     1270      950      950      950
GR   187.8      220      185.8      475      186.2      670     183.2      870     174.5     1080
GR   164.0     1195     162.5     1225     158.7     1230     158.8     1240     157.7     1250
GR   156.8     1260     159.5     1265     162.5     1270     164.6     1295     178.1     1445
GR   180.0     1670     201.0     1960     208.5     2020     218.8     2175     238.5     2410

NC     0.12     0.12     0.055
ET                                               9.12                      1190     1380
X1  265908       22     1190     1300      128      128      128
X2       10                                                      174.5    178.5
GR   187.8      220      185.8      475      186.2      670     183.2      870     174.5     1060
GR   164.4     1190     164.0     1195     162.5     1225     159.7     1230     158.8     1240
GR   157.7     1250     158.8     1260     159.5     1265     162.5     1270     164.6     1295
GR   165.1     1300     178.1     1445     180.0     1670     203.0     1660     208.5     2020
GR   218.8     2175     238.5     2415

SE      .90      1.5      2.5        0       89      4.0     1618      .72     160.0    160.0
ET                                               9.11                      1190     1300
X1  265922                                              24       24      24
X2                        1      176.1    180.2
X3       18                                                      180.7    180.7
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ST	10	200	189.5	0	490	185.8	0	640	184.5	0
ST	470	182.3	0	1190	180.2	176.7	1360	180.2	176.7	1425
ST	183.5	0	1660	188.8	0	1990	203.5	0	2255	214.7
ST	0	2510	215.8	0	2795	214.5	0			
ST						9.11			1150	1350
X1	266050	20	1225	1270	128	118	116			
GR	187.8	220	185.8	675	186.2	670	183.2	870	174.5	1360
GR	164.0	1195	167.5	1225	159.7	1230	158.8	1240	157.7	1250
GR	158.9	1260	159.5	1265	162.5	1270	164.6	1295	178.1	1445
GR	180.8	1670	203.0	1860	208.5	2020	219.8	2175	239.3	2415
ST						9.11			1100	1400
X1	266430	0	0	0	8380	8380	8380		0.3	
ST						9.11			1550	1950
X1	267638	18	1655	1695	1208	1208	1208		-0.9	
GR	210.1	410	196.5	715	187.2	1080	183.8	1350	173.1	1510
GR	168.0	1635	164.5	1655	161.7	1660	160.5	1670	160.5	1680
GR	161.6	1690	164.5	1695	167.1	1725	183.2	2060	206.1	2325
GR	222.3	2515	226.6	2690	244.1	2995	248.5	3245		
MC	0.12	0.12	0.055							
ET						9.11			1606	1754
X1	267815	21	1606	1754	177	177	177		-.4	
X2	10							181.5	181.5	
GR	210.1	410	196.5	715	187.2	1080	183.8	1350	173.1	1510
GR	169.2	1606	168.0	1635	164.5	1655	161.7	1660	160.5	1670
GR	160.5	1680	161.6	1690	164.5	1695	167.1	1725	183.2	1754
GR	183.2	2060	206.1	2325	222.3	2515	226.6	2690	244.1	2995
GR	248.5	3245								

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SR	1.35	1.5	2.5	0	60	3.8	2060	2.58	181.5	181.5
ET						9.11			1606	1754
X1	267845				30	30	30			
X2				1	181.0	181.0				
X1	10							185.5	185.5	
ST	14	200	208.1	0	460	203.8	0	725	197.5	0
ST	1610	191.5	0	1330	187.8	0	1606	185.0	181.0	1754
ST	185.0	181.8	1870	186.8	0	2065	190.8	0	2200	194.1
ST	0	2410	204.4	0	2710	216.9	0	3040	238.5	0
ST	3355	236.1	0							
ST						9.11			1550	1950
X1	267940	19	1655	1695	95	95	95			
GR	210.1	410	196.5	715	187.2	1080	183.8	1350	173.1	1510
GR	168.0	1635	164.5	1655	161.7	1660	160.5	1670	160.5	1680
GR	161.6	1690	164.5	1695	167.1	1725	183.2	2060	206.1	2325
GR	222.3	2515	226.6	2690	244.1	2995	248.5	3245		
MC	0.12	0.12	0.055							
ET						9.11			1550	1950
X1	268647	0	0	0	707	707	707			
ET						9.11			1550	1950
X1	268648	18	1570	1790	1	1	1			
GR	209.3	200	198.1	555	187.1	875	182.5	1120	187.9	1320
GR	179.0	1425	177.2	1480	170.8	1569	168.5	1570	168.5	1660
GR	170.8	1661	170.8	1790	182.5	2015	202.5	2280	217.5	2500
GR	239.5	2800								
ET						9.11			1550	1950
X1	268651	0	0	0	3	3	3			
ET						9.11			1550	1950
X1	268652	18	1655	1695	1	1	1			
GR	210.1	410	196.5	715	187.2	1080	183.8	1350	173.1	1510
GR	168.0	1635	164.5	1655	161.7	1660	160.5	1670	160.5	1680
GR	161.6	1690	164.5	1695	167.1	1725	183.2	2060	206.1	2325
GR	222.3	2515	226.6	2690	244.1	2995	248.5	3245		
ET						9.11			1550	1950
X1	268653	0	0	0	1	1	1			
ET						9.11			1550	1950
X1	268654	0	0	0	1	1	1			
ET						9.11			1550	1950
X1	268655	0	0	0	1	1	1			

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ET						9.11			1550	1950
X1	268657	0	0	0	2	2	2			
ET						9.11			1550	1950
X1	268660	0	0	0	3	3	3			
ET						9.11			1550	1950
X1	268700	0	0	0	40	40	40			
ET						9.11			1550	1950
X1	269000	0	0	0	8300	8300	8300			

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LITTLE RIVER

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
1.000	6816.00	61.85	.00	.00	.00	909.00	.00
1.000	12512.00	70.00	8.40	.00	8.40	1626.11	.00
1.000	15660.00	71.40	1.40	.00	9.80	1633.00	.00
1.000	26100.00	73.60	2.20	.00	.00	2162.46	.00
150.000	6816.00	61.71	.00	.11	.00	921.55	150.00
150.000	12512.00	70.01	8.30	.01	8.30	1626.11	150.00
150.000	15660.00	71.41	1.40	.01	9.70	1633.07	150.00
150.000	26100.00	73.62	2.20	.02	.00	2162.62	150.00
300.000	6816.00	61.95	.00	.24	.00	1477.34	150.00
300.000	12512.00	70.05	8.09	.02	8.09	2009.91	150.00
300.000	15660.00	71.45	1.40	.03	9.50	2017.81	150.00
300.000	26100.00	73.65	2.20	.03	.00	2775.49	150.00
500.000	6816.00	62.14	.00	.19	.00	1396.66	200.00
500.000	12512.00	70.06	7.91	.01	7.91	1909.46	200.00
500.000	15660.00	71.46	1.40	.01	9.32	1917.97	200.00
500.000	26100.00	73.67	2.20	.02	.00	2776.04	200.00
800.000	6816.00	62.38	.00	.23	.00	988.12	400.00
800.000	12512.00	70.08	7.70	.02	7.70	1300.00	400.00
800.000	15660.00	71.48	1.40	.02	9.10	1300.00	400.00
800.000	26100.00	73.69	2.21	.03	.00	2153.46	400.00
1400.000	6816.00	62.57	.00	.19	.00	657.16	500.00
1400.000	12512.00	70.10	7.53	.02	7.53	900.00	500.00
1400.000	15660.00	71.50	1.40	.02	8.93	900.00	500.00
1400.000	26100.00	73.72	2.22	.03	.00	3043.23	500.00
2485.000	6816.00	63.72	.00	1.15	.00	430.00	1085.00
* 2485.000	12512.00	70.31	6.60	.22	6.60	430.00	1085.00
* 2485.000	15660.00	71.72	1.41	.22	8.00	430.00	1085.00
* 2485.000	26100.00	73.58	1.86	-.14	9.87	1190.82	1085.00
2535.000	6816.00	63.98	.00	.27	.00	400.00	50.00
2535.000	12512.00	70.40	6.41	.09	6.41	400.00	50.00
2535.000	15660.00	71.81	1.42	.09	7.83	400.00	50.00
2535.000	26100.00	73.87	2.06	.29	9.89	1248.63	50.00
2595.000	6816.00	64.01	.00	.09	.00	317.97	60.00
2595.000	12512.00	70.49	6.42	.10	6.42	400.00	60.00
2595.000	15660.00	71.94	1.45	.13	7.87	627.22	60.00
2595.000	26100.00	73.92	1.99	.05	9.86	1064.68	60.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
2605.000	6816.00	64.09	.00	.02	.08	307.33	10.00
2605.000	12512.00	70.87	6.78	.38	6.78	400.00	10.00
2605.000	15660.00	72.55	1.68	.61	8.46	1069.05	10.00
2605.000	26100.00	75.10	2.55	1.17	11.01	1157.46	10.00
* 2615.000	6816.00	64.17	.00	.08	.00	218.14	10.00
2615.000	12512.00	70.82	6.65	-.06	6.65	425.00	10.00
2615.000	15660.00	72.47	1.66	-.08	8.30	425.00	10.00
2615.000	26100.00	74.99	2.52	-.11	10.82	1078.58	10.00
2675.000	6816.00	64.38	.00	.01	.00	500.00	60.00
2675.000	12512.00	70.88	6.70	.06	6.70	500.00	60.00
2675.000	15660.00	72.54	1.67	.07	8.36	500.00	60.00
2675.000	26100.00	75.16	2.62	.17	10.98	1298.55	60.00
2735.000	6816.00	64.38	.00	.21	.00	583.57	60.00
2735.000	12512.00	70.89	6.68	.11	6.68	660.00	60.00
2735.000	15660.00	72.67	1.65	.13	8.28	660.00	60.00
2735.000	26100.00	75.28	2.62	.13	10.90	1253.69	60.00
4400.000	6816.00	65.62	.00	1.24	.00	673.07	1665.00
4400.000	12512.00	71.43	5.81	.45	5.81	1329.17	1665.00
4400.000	15660.00	73.13	1.70	.46	7.50	1382.52	1665.00
4400.000	26100.00	75.93	2.80	.84	10.30	1897.22	1665.00
5900.000	6816.00	66.78	.00	1.16	.00	880.84	1500.00
5900.000	12512.00	71.80	5.01	.36	5.01	1738.48	1500.00
5900.000	15660.00	73.45	1.66	.32	6.67	1923.53	1500.00
5900.000	26100.00	76.32	2.87	.40	9.54	2341.91	1500.00
* 7200.000	6816.00	67.44	.00	.66	.00	1360.38	1300.00
* 7200.000	12512.00	72.08	4.64	.28	4.64	1528.52	1300.00
7200.000	15660.00	73.70	1.62	.25	6.26	1556.32	1300.00
7200.000	26100.00	76.61	2.91	.28	9.17	1619.19	1300.00
* 8070.000	6816.00	67.67	.00	.23	.00	700.00	870.00
* 8070.000	12512.00	72.16	4.49	.08	4.49	700.00	870.00
* 8070.000	15660.00	73.77	1.61	.07	6.10	700.00	870.00
8070.200	26100.00	76.74	2.97	.12	9.06	2117.62	870.00
8110.000	6816.00	67.56	.00	-.09	.00	314.83	40.00
8110.000	12512.00	71.99	4.41	-.17	4.41	369.86	40.00
* 8110.000	15660.00	73.57	1.57	-.20	5.99	630.33	40.00
* 8110.000	26100.00	76.33	2.81	-.36	8.74	1917.48	40.00
8135.000	6816.00	67.55	.00	.01	.00	272.96	25.00

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 8135.000  12512.00   71.87    4.36     -.02     4.38    314.61    25.00
 8135.000  15660.00   73.53    1.56     -.04     5.94    475.47    25.00
 8135.000  26100.00   76.17    2.64     -.20     8.58    725.00    25.00

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     SECNO         Q       CWSEL    DIFWSP    DIFWSX    DIFKWS    TOPWID     XLCH

 8170.000   6816.00   67.90      .00      .31       .00    680.00     35.00
*8170.000  12512.00   72.39     4.49      .42      4.49    680.00     35.00
*8170.000  15660.00   74.02     1.63      .48      6.12    680.00     35.00
*8170.000  26100.00   76.93     2.91      .78      9.03    680.00     35.00

 8735.000   6816.00   68.13      .00      .23       .00    280.00    565.00
*8735.000  12512.00   72.42     4.28      .03      4.28    280.00    565.00
*8735.000  15660.00   74.00     1.58     -.03      5.86    280.00    565.00
*8735.000  26100.00   76.76     2.77     -.18      8.63    280.00    565.00

 8825.000   6816.00   68.23      .00      .10       .00    310.00     90.00
 8825.000  12512.00   72.53     4.30      .12      4.30    310.00     90.00
 8825.000  15660.00   74.13     1.60      .14      5.90    310.00     90.00
 8825.000  26100.00   77.02     2.88      .25      8.79    310.00     90.00

 8855.000   6816.00   68.15      .00     -.08       .00    270.00     30.00
 8855.000  12512.00   72.42     4.27     -.11      4.27    270.00     30.00
 8855.000  15660.00   74.00     1.58     -.13      5.85    270.00     30.00
 8855.000  26100.00   76.77     2.77     -.25      8.62    270.00     30.00

 8870.000   6816.00   68.36      .00      .22       .00    223.61     15.00
 8870.000  12512.00   72.71     4.34      .28      4.34    254.35     15.00
 8870.000  15660.00   74.35     1.64      .35      5.98    265.98     15.00
 8870.000  26100.00   77.47     3.13      .78      9.11    283.00     15.00

 8885.000   6816.00   68.35      .00     -.01       .00    197.45     15.00
 8885.000  12512.00   72.67     4.32     -.04      4.32    224.90     15.00
 8885.000  15660.00   74.30     1.63     -.05      5.95    235.27     15.00
*8885.000  26100.00   77.22     2.91     -.28      8.87    280.39     15.00

 8915.000   6816.00   68.38      .00      .03       .00    197.62     30.00
 8915.000  12512.00   72.70     4.32      .03      4.32    225.05     30.00
 8915.000  15660.00   74.33     1.63      .03      5.95    235.43     30.00
 8915.000  26100.00   77.34     3.01      .13      8.96    280.59     30.00

 8945.000   6816.00   68.45      .00      .07       .00    224.22     30.00
 8945.000  12512.00   72.80     4.34      .10      4.34    254.99     30.00
 8945.000  15660.00   74.45     1.65      .12      6.00    266.68     30.00
*8945.000  26100.00   77.48     3.03      .54      9.03    283.00     30.00

 8950.000   6816.00   68.34      .00     -.11       .00    267.73      5.00
 8950.000  12512.00   72.65     4.32     -.14      4.32    290.00      5.00
 8950.000  15660.00   74.28     1.63     -.17      5.94    290.00      5.00
 8950.000  26100.00   77.57     3.29     -.31      9.23    290.00      5.00

 9075.000   6816.00   68.60      .00      .27       .00    420.00    120.00
 9075.000  12512.00   72.99     4.39      .33      4.39    420.00    120.00
 9075.000  15660.00   74.67     1.68      .39      6.07    420.00    120.00
 9075.000  26100.00   78.24     3.57      .68      9.64    420.00    120.00

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     SECNO         Q       CWSEL    DIFWSP    DIFWSX    DIFKWS    TOPWID     XLCH

10360.000   6816.00   69.35      .00      .74       .00   1232.27   1285.00
*10360.000  12512.00   73.61     4.26      .62      4.26   1324.55   1285.00
*10360.000  15660.00   75.33     1.72      .66      5.98   1353.28   1285.00
*10360.000  26100.00   79.05     3.72      .80      9.70   2288.53   1285.00

*13400.000   6816.00   70.06      .00      .71       .00   2011.22   3640.00
 13400.000  12512.00   74.03     3.97      .41      3.97   2281.62   3640.00
 13400.000  15660.00   75.71     1.69      .38      5.65   2393.75   3640.00
 13400.000  26100.00   79.26     3.56      .22      9.21   3930.48   3640.00

 15400.000   6816.00   70.44      .00      .38       .00   1833.15   2000.00
*15400.000  12512.00   74.26     3.82      .23      3.82   1855.63   2000.00
*15400.000  15660.00   75.91     1.66      .21      5.48   1872.18   2000.00
*15400.000  26100.00   79.40     3.48      .13      8.96   1118.57   2000.00

*16435.000   6816.00   70.74      .00      .31       .00    400.00   1835.00
*16435.000  12512.00   74.40     3.65      .14      3.65    400.00   1835.00
*16435.000  15660.00   76.00     1.61      .09      5.26    400.00   1835.00
*16435.000  26100.00   79.38     3.38     -.01      8.65    400.00   1835.00

 16705.000   6816.00   71.02      .00      .28       .00    171.30    270.00
 16705.000  12512.00   74.59     3.57      .19      3.57    171.85    270.00
 16705.000  15660.00   76.15     1.56      .14      5.13    172.38    270.00
 16705.000  26100.00   79.42     3.28      .04      8.40    172.80    270.00

 16725.000   6816.00   71.25      .00      .02       .00    171.23     20.00
 16725.000  12512.00   74.81     3.57      .01      3.57    171.87     20.00
 16725.000  15660.00   76.37     1.56      .01      5.13    171.86     20.00
 16725.000  26100.00   79.66     3.29      .04      8.42    172.26     20.00

 16755.000   6816.00   71.08      .00      .04       .00    171.24     30.00
 16755.000  12512.00   74.65     3.57      .04      3.57    171.89     30.00
 16755.000  15660.00   76.22     1.56      .04      5.13    171.86     30.00
 16755.000  26100.00   79.52     3.31      .06      8.44    185.19     30.00

 16770.000   6816.00   71.14      .00      .05       .00    162.28     15.00
 16770.000  12512.00   74.76     3.62      .11      3.62    183.02     15.00
 16770.000  15660.00   76.38     1.60      .14      5.22    184.23     15.00

 16770.000  26100.00   79.83     3.45      .28      8.63    196.84     15.00

 16785.000   6816.00   71.24      .00      .10       .00    187.79     15.00
 16785.000  12512.00   74.89     3.65      .13      3.65    209.25     15.00
 16785.000  15660.00   76.51     1.62      .15      5.27    214.93     15.00
 16785.000  26100.00   80.10     3.59      .29      8.86   1267.89     15.00

 16815.000   6816.00   71.26      .00      .02       .00    197.86     30.00
 16815.000  12512.00   74.92     3.65      .03      3.65    209.34     30.00
 16815.000  15660.00   76.54     1.62      .03      5.27    214.42     30.00
 16815.000  26100.00   80.14     3.60      .04      8.88   1264.99     30.00

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     SECNO         Q       CWSEL    DIFWSP    DIFWSX    DIFKWS    TOPWID     XLCH

 16845.000   6816.00   71.24      .00     -.02       .00    190.27     30.00
 16845.000  12512.00   74.88     3.64     -.04      3.64    193.11     30.00
 16845.000  15660.00   76.48     1.61     -.05      5.24    194.33     30.00
 16845.000  26100.00   80.02     3.53     -.12      8.78    196.99     30.00

 16875.000   6816.00   71.34      .00      .10       .00    300.00     30.00
 16875.000  12512.00   75.02     3.68      .14      3.68    300.00     30.00
 16875.000  15660.00   76.66     1.64      .17      5.32    300.00     30.00
 16875.000  26100.00   80.31     3.66      .29      8.98    300.00     30.00

*19900.000   6816.00   72.82      .00     1.49       .00   1267.07   3025.00
*19900.000  12512.00   76.46     3.64     1.44      3.64   1304.55   3025.00
*19900.000  15660.00   78.13     1.67     1.48      5.31   1356.81   3025.00
*19900.000  26100.00   81.77     3.64     1.46      8.95   6935.45   3025.00

 22800.000   6816.00   74.06      .00     1.23       .00   1650.47   2900.00
 22800.000  12512.00   77.24     3.19      .78      3.19   1659.64   2900.00
 22800.000  15660.00   78.80     1.56      .67      4.74   1880.00   2900.00
 22800.000  26100.00   82.05     3.25      .28      8.00   6541.33   2900.00

*25800.000   6816.00   75.20      .00     1.14       .00   1439.66   3000.00
 25800.000  12512.00   78.02     2.82      .78      2.82   2683.03   3000.00
 25800.000  15660.00   79.44     1.42      .64      4.24   2700.00   3000.00
*25800.000  26100.00   82.22     2.78      .26      7.12   8246.23   3000.00

*28900.000   6816.00   76.29      .00     1.18       .00   2146.69   3100.00
*28900.000  12512.00   78.88     2.58      .86      2.58   2574.39   3100.00
 28900.000  15660.00   80.15     1.27      .71      3.85   2580.73   3100.00
*28900.000  26100.00   82.60     2.45      .26      6.30   8233.29   3100.00

*32400.000   6816.00   77.81      .00     1.52       .00   3592.45   3500.00
*32400.000  12512.00   79.85     2.03      .97      2.03   3719.93   3500.00
*32400.000  15660.00   80.93     1.08      .78      3.12   3759.86   3500.00
 32400.000  26100.00   83.10     2.17      .50      5.29   7690.36   3500.00

*36600.000   6816.00   79.19      .00     1.38       .00    809.77   4200.00
*36600.000  12512.00   81.11     1.92     1.27      1.92   2317.89   4200.00
*36600.000  15660.00   82.05      .94     1.12      2.86   3260.24   4200.00
*36600.000  26100.00   83.98     1.93      .99      4.79   3646.64   4200.00

 38300.000   6816.00   79.99      .00      .80       .00   2041.90   1700.00
*38300.000  12512.00   82.14     2.15     1.03      2.15   3146.03   1700.00
*38300.000  15660.00   83.04      .90      .98      3.05   3306.82   1700.00
*38300.000  26100.00   84.97     1.93      .99      4.98   3649.69   1700.00

 40100.000   6816.00   80.70      .00      .73       .00   1458.75   1400.00
 40100.000  12512.00   82.85     2.15      .71      2.15   2315.54   1400.00
 40100.000  15660.00   83.73      .88      .69      3.03   2646.48   1400.00
 40100.000  26100.00   85.73     2.00      .76      5.03   3536.26   1400.00

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     SECNO         Q       CWSEL    DIFWSP    DIFWSX    DIFKWS    TOPWID     XLCH

 41090.000   6816.00   81.96      .00      .26       .00    534.11    990.00
 41090.000  12512.00   83.28     2.22      .43      2.22   1393.68    990.00
 41090.000  15660.00   84.18      .98      .45      3.12   4845.79    990.00
 41090.000  26100.00   86.71     2.84      .49      5.15   6481.58    990.00

 44420.000   6816.00   82.89      .00     1.03       .00   1403.41   3330.00
 44420.000  12512.00   84.63     2.54     1.35      2.54   1576.80   3330.00
 44420.000  15660.00   85.58      .93     1.39      3.47   6645.03   3330.00
 44420.000  26100.00   87.41     1.85     1.20      5.32   6782.98   3330.00

 47720.000   6816.00   83.21      .00     1.12       .00    822.56   3300.00
 47720.000  12512.00   85.67     2.46     1.04      2.46   6769.43   3300.00
 47720.000  15660.00   86.51      .84      .95      3.30   6953.19   3300.00
 47720.000  26100.00   88.27     1.75      .85      5.05   7128.42   3300.00

 56220.000   6480.00   87.87      .00     3.86       .00   2531.73   8500.00
 56220.000  11960.00   88.99     1.91     3.31      1.91   2683.56   8500.00
 56220.000  15030.00   89.61      .62     3.09      2.53   2737.00   8500.00
 56220.000  25036.00   91.26     1.66     3.60      4.19   3865.18   8500.00

*59700.000   6480.00   88.95      .00     1.81       .00    433.18   3480.00
*59700.000  11960.00   90.70     1.76     1.72      1.76    640.82   3480.00
*59700.000  15030.00   91.68      .98     1.68      2.54    747.59   3480.00
*59700.000  25036.00   93.49     2.00     2.22      4.54    965.80   3480.00

 60430.000   6480.00   89.88      .00      .83       .00    310.34    730.00
 60430.000  11960.00   92.30     2.42     1.60      2.42   1023.87    730.00
 60430.000  15030.00   93.31     1.00     1.98      3.48   1161.01    730.00
 60430.000  25036.00   95.81     2.49     2.33      5.97   1294.63    730.00
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	60685.000	6480.00	98.26	.00	.39	.00	166.89	255.00
	60685.000	11960.00	92.97	2.70	.65	2.70	216.00	255.00
	60685.000	15030.00	94.05	1.08	.69	3.79	216.00	255.00
*	60685.000	25056.00	97.32	3.27	1.47	7.06	1579.77	255.00
	60715.000	6480.00	98.38	.00	.04	.00	160.13	30.00
	60715.000	11960.00	92.83	2.73	.07	2.73	216.00	30.00
	60715.000	15030.00	94.14	1.10	.08	3.84	216.00	30.00
	60715.000	25056.00	98.52	4.38	1.20	8.22	1633.51	30.00
	60964.000	6480.00	98.45	.00	.16	.00	420.76	249.00
	60964.000	11960.00	93.39	2.93	.35	2.93	1104.88	249.00
	60964.000	15030.00	94.84	1.26	.51	4.19	1210.83	249.00
	60964.000	25056.00	98.47	3.82	-.05	8.02	1465.92	249.00
	61564.000	6480.00	90.98	.00	.54	.00	888.27	600.00
	61564.000	11960.00	84.13	5.14	.74	5.14	1401.81	600.00
*	61564.000	15030.00	85.42	1.29	.77	6.43	1578.26	600.00
*	61564.000	25056.00	99.14	3.72	.67	9.15	1831.57	600.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
*	68410.000	6480.00	93.25	.00	2.26	.00	782.87	6846.00
*	68410.000	11960.00	96.51	3.26	2.28	3.26	1598.91	6846.00
	68410.000	15030.00	97.80	1.29	2.38	4.55	1970.34	6846.00
	68410.000	25056.00	101.21	3.41	2.07	7.96	2950.96	6846.00
	82720.000	6480.00	95.49	.00	2.24	.00	5049.29	14310.00
*	82720.000	11960.00	98.17	2.68	1.66	2.68	5216.78	14310.00
*	82720.000	15030.00	99.33	1.16	1.53	3.84	5433.65	14310.00
*	82720.000	25056.00	102.47	3.14	1.26	6.98	5796.51	14310.00
*	92800.000	6480.00	97.27	.00	1.78	.00	3907.98	10000.00
*	92800.000	11960.00	99.14	1.87	.97	1.87	6413.84	10000.00
*	92800.000	15030.00	100.12	.99	.79	2.85	6514.46	10000.00
	92800.000	25056.00	103.01	2.89	.54	5.74	6774.80	10000.00
*	93600.000	6480.00	97.49	.00	.22	.00	2349.73	800.00
*	93600.000	11960.00	99.29	1.80	.15	1.80	4224.79	800.00
*	93600.000	15030.00	100.26	.97	.14	2.77	5020.52	800.00
*	93600.000	25056.00	103.10	2.84	.09	5.61	5247.96	800.00
*	93755.000	6480.00	97.76	.00	.27	.00	178.05	155.00
*	93755.000	11960.00	99.64	1.87	.15	1.87	4822.48	155.00
*	93755.000	15030.00	100.33	.69	.07	2.56	5529.78	155.00
	93755.000	25056.00	103.12	2.79	.02	5.36	5571.90	155.00
	93785.000	6480.00	97.81	.68	.04	.00	178.00	30.00
	93785.000	11960.00	99.47	1.66	.03	1.66	4710.28	30.00
	93785.000	15030.00	100.33	.86	.00	2.52	5529.83	30.00
	93785.000	25056.00	103.12	2.79	.00	5.31	5571.94	30.00
*	93950.000	6480.00	97.83	.00	.02	.00	2685.21	165.00
*	93950.000	11960.00	99.53	1.71	.07	1.71	4471.73	165.00
*	93950.000	15030.00	100.40	.86	.07	2.57	5031.65	165.00
	93950.000	25056.00	103.17	2.77	.05	5.34	5253.60	165.00
	94410.000	6480.00	98.28	.00	.45	.00	3152.38	460.00
	94410.000	11960.00	99.89	1.61	.36	1.61	4966.11	460.00
	94410.000	15030.00	100.67	.78	.27	2.39	5053.32	460.00
	94410.000	25056.00	103.29	2.62	.12	5.01	5263.19	460.00
	110700.000	6480.00	103.89	.00	5.61	.00	5426.25	16290.00
	110700.000	11960.00	105.00	1.12	5.11	1.12	5998.59	16290.00
	110700.000	15030.00	105.40	.40	4.74	1.52	6622.53	16290.00
	110700.000	25056.00	106.55	1.15	3.26	2.67	7800.05	16290.00
	113850.000	6480.00	104.65	.00	.76	.00	1778.78	3150.00
	113850.000	11960.00	106.01	1.36	1.81	1.36	2546.49	3150.00
	113850.000	15030.00	106.54	.53	1.14	1.90	2784.71	3150.00
	113850.000	25056.00	107.92	1.38	1.37	3.28	3435.37	3150.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	118530.000	6480.00	105.69	.00	1.04	.00	976.93	4680.00
	118530.000	11960.00	107.80	2.11	1.79	2.11	1115.09	4680.00
	118530.000	15030.00	108.68	.88	2.14	2.99	1173.81	4680.00
	118530.000	25056.00	110.89	2.28	2.96	5.26	2473.66	4680.00
	121500.000	6480.00	106.53	.00	.87	.00	370.78	2970.00
	121500.000	11960.00	109.19	2.62	1.39	2.62	436.28	2970.00
	121500.000	15030.00	110.30	1.11	1.61	3.73	450.22	2970.00
	121500.000	25056.00	112.98	2.68	2.09	6.41	488.28	2970.00
	123580.000	6480.00	107.27	.00	.70	.00	315.17	2080.00
	123580.000	11960.00	110.30	3.03	1.11	3.03	360.39	2080.00
	123580.000	15030.00	111.81	1.51	1.31	4.54	385.22	2080.00
	123580.000	25056.00	114.89	3.09	1.91	7.63	451.47	2080.00
	123659.000	6480.00	107.30	.00	.03	.00	315.55	79.00
	123659.000	11960.00	110.34	3.05	.04	3.05	361.92	79.00
	123659.000	15030.00	111.84	1.51	.05	4.56	386.22	79.00
	123659.000	25056.00	114.93	3.09	.01	7.65	455.11	79.00
*	123660.000	6480.00	108.53	.00	2.21	.00	436.66	1.00
*	123660.000	11960.00	110.74	1.24	.48	1.24	494.42	1.00
*	123660.000	15030.00	111.36	.62	-.29	1.86	509.75	1.00
	123660.000	25056.00	113.97	2.56	1.95	4.41	584.04	1.00
	123661.000	6480.00	109.51	.00	.01	.00	434.67	1.00
	123661.000	11960.00	110.76	1.24	.02	1.24	494.61	1.00
	123661.000	15030.00	111.37	.62	.00	1.86	509.81	1.00
	123661.000	25056.00	113.92	2.55	.00	4.41	583.93	1.00
*	123662.000	6480.00	110.69	.00	1.18	.00	367.85	1.00
*	123662.000	11960.00	112.27	1.58	1.61	1.58	403.89	1.00
	123662.000	15030.00	113.15	.79	1.78	2.46	420.94	1.00
	123662.000	25056.00	115.41	2.25	1.49	4.71	469.68	1.00
	123663.000	6480.00	110.69	.00	.00	.00	367.76	1.00
	123663.000	11960.00	112.27	1.58	.00	1.58	404.03	1.00
	123663.000	15030.00	113.15	.79	.00	2.46	420.99	1.00
	123663.000	25056.00	115.41	2.25	.00	4.72	469.74	1.00
	123665.000	6480.00	110.69	.00	.00	.00	367.76	2.00
	123665.000	11960.00	112.27	1.58	.00	1.58	404.07	2.00
	123665.000	15030.00	113.16	.79	.00	2.46	421.06	2.00
	123665.000	25056.00	115.41	2.26	.01	4.72	469.86	2.00
	123670.000	6480.00	110.70	.00	.00	.00	367.82	5.00
	123670.000	11960.00	112.28	1.58	.01	1.58	404.20	5.00
	123670.000	15030.00	113.17	.79	.01	2.47	421.23	5.00
	123670.000	25056.00	115.43	2.26	.01	4.73	470.14	5.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	123680.000	6480.00	110.70	.00	.01	.00	367.85	10.00
	123680.000	11960.00	112.29	1.59	.01	1.59	404.47	10.00
	123680.000	15030.00	113.18	.79	.02	2.48	421.57	10.00
	123680.000	25056.00	115.46	2.27	.02	4.75	470.69	10.00
	123720.000	6480.00	110.73	.00	.02	.00	368.45	40.00
	123720.000	11960.00	112.44	1.72	.05	1.72	405.51	40.00
	123720.000	15030.00	113.25	.81	.07	2.52	422.89	40.00
	123720.000	25056.00	115.57	2.32	.11	4.84	472.97	40.00
	123770.000	6480.00	110.74	.00	.01	.00	218.10	50.00
	123770.000	11960.00	112.49	1.75	.04	1.75	349.10	50.00
	123770.000	15030.00	113.30	.82	.06	2.56	382.52	50.00
	123770.000	25056.00	115.66	2.35	.09	4.92	451.96	50.00
	123790.000	6480.00	110.76	.00	.02	.00	218.22	20.00
	123790.000	11960.00	113.40	2.64	.91	2.64	226.08	20.00
	123790.000	15030.00	114.49	1.10	1.18	3.74	426.97	20.00
	123790.000	25056.00	116.81	2.32	1.15	6.06	476.83	20.00
	123940.000	6480.00	110.90	.00	.15	.00	372.11	150.00
	123940.000	11960.00	113.65	2.75	.26	2.75	431.81	150.00
	123940.000	15030.00	114.72	1.07	.23	3.82	454.88	150.00
	123940.000	25056.00	117.16	2.44	.35	6.26	507.71	150.00
	125600.000	6480.00	112.02	.00	1.12	.00	208.76	1660.00
	125600.000	11960.00	115.25	3.23	1.59	3.23	427.97	1660.00
	125600.000	15030.00	116.58	1.33	1.06	4.56	470.52	1660.00
	125600.000	25056.00	119.88	3.29	2.70	7.84	575.65	1660.00
	127500.000	6480.00	114.09	.00	2.07	.00	451.72	1900.00
	127500.000	11960.00	117.73	3.64	2.48	3.64	530.86	1900.00
	127500.000	15030.00	119.26	1.53	2.68	5.17	563.67	1900.00
	127500.000	25056.00	123.09	3.83	3.23	9.00	642.01	1900.00
	128430.000	6480.00	114.98	.00	.82	.00	234.52	930.00
	128430.000	11960.00	118.59	3.60	.86	3.60	277.62	930.00
	128430.000	15030.00	120.14	1.55	.89	5.24	291.41	930.00
	128430.000	25056.00	124.02	3.87	.83	9.11	325.87	930.00
	130250.000	6480.00	116.29	.00	1.39	.00	280.32	1820.00
	130250.000	11960.00	120.42	4.13	1.83	4.13	308.55	1820.00
	130250.000	15030.00	122.19	1.77	2.05	5.90	356.70	1820.00
	130250.000	25056.00	126.71	4.51	2.69	10.42	1027.07	1820.00
	130560.000	6480.00	116.60	.00	.31	.00	388.57	310.00
	130560.000	11960.00	120.86	4.26	.44	4.26	525.81	310.00
	130560.000	15030.00	122.70	1.84	.51	6.11	581.68	310.00
	130560.000	25056.00	127.25	4.55	.55	10.66	717.80	310.00

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	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	130860.000	6480.00	116.86	.00	.26	.00	764.61	300.00
*	130860.000	11960.00	121.19	4.33	.33	4.33	837.67	300.00
*	130860.000	15030.00	123.05	1.86	.34	6.19	865.37	300.00
*	130860.000	25056.00	127.65	4.61	.40			

* 131160.000	8136.40	117.06	.00	.20	.00	1640.35	900.00
* 131160.000	11316.00	121.37	4.31	.19	4.31	1664.99	900.00
* 131160.000	14220.00	123.24	1.86	.19	6.17	1675.67	900.00
* 131160.000	23838.00	127.97	4.63	.21	10.81	1684.03	900.00
132650.000	8134.40	117.11	.00	.05	.00	1169.50	890.00
132650.000	11316.00	121.42	4.30	.04	4.33	1275.45	890.00
132650.000	14220.00	123.28	1.86	.04	6.18	1323.99	890.00
132650.000	23838.00	127.91	4.63	.01	10.80	1503.26	890.00

* 134650.000	6134.40	117.25	.00	.14	.00	2611.21	2060.00
* 134650.000	11916.00	121.54	4.29	.12	4.29	2795.39	2060.00
* 134650.000	14720.00	123.40	1.86	.12	6.15	2814.49	2060.00
* 134650.000	23878.00	128.34	4.64	.12	10.79	4800.00	2060.00
* 144570.000	5904.00	118.82	.00	.77	.00	2760.33	9920.00
* 144570.000	10948.00	121.97	3.95	.43	3.95	5490.25	9920.00
* 144570.000	13770.00	122.76	1.79	.26	5.74	5752.04	9920.00
144570.000	23316.00	128.31	4.55	.27	10.28	8213.27	9920.00
* 145260.000	5904.00	119.30	.00	.28	.00	2203.17	690.00
* 145260.000	10948.00	122.83	3.73	.06	3.73	3127.38	690.00
* 145260.000	13770.00	123.80	1.76	.04	5.50	3612.99	690.00
* 145260.000	23316.00	128.33	4.53	.02	10.02	4946.92	690.00
145900.000	5904.00	119.35	.00	1.05	.00	1496.63	640.00
145900.000	10948.00	122.29	2.94	.25	2.94	2793.41	640.00
145900.000	13770.00	123.95	1.67	.16	4.60	3355.77	640.00
145900.000	23316.00	128.39	4.44	.07	9.04	3862.98	640.00
147210.000	5904.00	120.55	.00	1.20	.00	2285.92	1310.00
147210.000	10948.00	122.72	2.18	.44	2.18	2546.96	1310.00
147210.000	13770.00	124.20	1.47	.25	3.65	2724.86	1310.00
147210.000	23316.00	128.48	4.28	.09	7.93	3260.27	1310.00
147940.000	5904.00	121.03	.00	.48	.00	1366.09	730.00
147940.000	10948.00	123.06	2.03	.33	2.03	2032.94	730.00
147940.000	13770.00	124.42	1.36	.22	3.39	2349.79	730.00
147940.000	23316.00	128.58	4.16	.10	7.55	3638.18	730.00
* 148185.000	5904.00	121.02	.00	.00	.00	97.79	225.00
148185.000	10948.00	123.24	2.22	.19	2.22	2286.73	225.00
148185.000	13770.00	124.57	1.33	.15	3.55	2399.32	225.00
148185.000	23316.00	128.65	4.08	.07	7.63	3640.93	225.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
148195.000	5904.00	121.04	.00	.01	.00	87.80	30.00
* 148195.000	10948.00	123.47	2.43	.22	2.43	100.00	30.00
148195.000	13770.00	125.99	2.52	1.42	4.95	2760.88	30.00
148195.000	23316.00	128.66	2.67	.01	7.62	3643.08	30.00
* 148340.000	5904.00	121.48	.00	.45	.00	1638.56	145.00
* 148340.000	10948.00	124.52	3.04	1.06	3.64	2386.16	145.00
148340.000	13770.00	126.02	1.50	.03	4.54	2467.43	145.00
148340.000	23316.00	128.68	2.67	.03	7.21	2681.19	145.00
160220.000	5904.00	123.77	.00	6.29	.00	417.36	11860.00
* 160220.000	10948.00	130.53	2.76	6.00	2.76	647.71	11860.00
* 160220.000	13770.00	131.44	.91	5.42	3.67	743.55	11860.00
* 160220.000	23316.00	134.55	3.11	5.86	6.78	1213.34	11860.00
165810.000	5904.00	131.60	.00	3.82	.86	815.55	5590.00
165810.000	10948.00	134.79	3.20	4.27	3.20	1851.92	5590.00
* 165810.000	13770.00	135.98	1.19	4.54	4.38	1976.65	5590.00
* 165810.000	23316.00	139.10	3.12	4.55	7.51	2139.83	5590.00
166035.000	5904.00	131.74	.00	.14	.00	210.00	225.00
166035.000	10948.00	134.89	3.14	.09	3.14	1506.08	225.00
166035.000	13770.00	136.06	1.17	.08	4.32	1715.38	225.00
166035.000	23316.00	139.17	3.11	.06	7.42	2044.43	225.00
166065.000	5904.00	131.75	.00	.01	.00	210.00	30.00
166065.000	10948.00	135.08	3.32	.19	3.32	210.00	30.00
166065.000	13770.00	136.68	1.60	.62	4.93	1808.15	30.00
166065.000	23316.00	139.47	2.79	.30	7.72	2052.40	30.00
166265.000	5904.00	131.92	.00	.17	.00	684.88	200.00
166265.000	10948.00	135.43	3.51	.26	3.51	1786.44	200.00
166265.000	13770.00	136.84	1.41	.16	4.92	1964.96	200.00
166265.000	23316.00	139.64	2.81	.17	7.72	2110.85	200.00
169000.000	5904.00	133.79	.00	1.87	.00	473.66	2735.00
169000.000	10948.00	137.20	3.41	1.77	3.41	608.94	2735.00
169000.000	13770.00	138.53	1.33	1.69	4.74	677.43	2735.00
169000.000	23316.00	141.52	2.99	1.87	7.73	908.39	2735.00
170540.000	5904.00	134.47	.00	.68	.00	854.66	1540.00
* 170540.000	10948.00	137.99	3.52	.39	3.52	1230.59	1540.00
* 170540.000	13770.00	139.39	1.40	.86	4.91	1445.16	1540.00
* 170540.000	23316.00	142.66	3.25	1.12	8.16	1912.57	1540.00
174050.000	5904.00	135.37	.00	1.29	.00	850.19	3510.00
174050.000	10948.00	139.21	3.84	1.22	3.84	1713.09	3510.00
174050.000	13770.00	140.58	1.38	1.20	6.03	1719.24	3510.00
174050.000	23316.00	143.92	3.33	1.29	8.16	1732.13	3510.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
176170.000	5904.00	136.74	.00	.59	.00	582.26	2060.00
176170.000	10948.00	140.35	3.61	.54	3.61	945.59	2060.00
176170.000	13770.00	141.91	1.55	.51	4.76	1284.81	2060.00
176170.000	23316.00	144.85	3.24	.52	8.16	1587.95	2060.00
* 177470.000	5904.00	137.28	.00	.46	.00	848.85	1340.00
* 177470.000	10948.00	140.72	3.52	.53	3.52	908.25	1340.00
* 177470.000	13770.00	142.12	1.40	.62	4.92	931.54	1340.00
* 177470.000	23316.00	145.55	3.43	.71	8.35	988.44	1340.00
* 177705.000	5904.00	137.20	.00	.00	.00	195.00	235.00
* 177705.000	10948.00	140.67	3.47	-.05	3.47	195.00	235.00
177705.000	13770.00	142.14	1.48	.03	4.95	843.40	235.00
177705.000	23316.00	145.60	3.44	.05	8.40	992.67	235.00
177735.000	5904.00	137.21	.00	.01	.00	195.00	30.00
177735.000	10948.00	140.74	3.54	.12	3.54	195.00	30.00
177735.000	13770.00	142.52	1.78	.33	5.31	846.86	30.00
177735.000	23316.00	145.73	3.20	.13	8.52	994.80	30.00
177912.000	5904.00	137.30	.00	.09	.00	721.15	177.00
177912.000	10948.00	140.88	3.58	.19	3.58	887.65	177.00
* 177912.000	13770.00	142.54	1.66	.02	5.24	933.50	177.00
* 177912.000	23316.00	145.74	3.20	.01	8.44	986.67	177.00
* 180750.000	5904.00	137.71	.00	.42	.00	2149.74	2838.00
* 180750.000	10948.00	141.42	3.70	.43	3.70	2244.36	2838.00
* 180750.000	13770.00	143.00	1.58	.46	5.28	2284.75	2838.00
* 180750.000	23316.00	146.27	3.27	.62	8.65	2370.89	2838.00
* 183479.000	5904.00	138.04	.00	.33	.00	1282.94	2729.00
* 183479.000	10948.00	141.71	3.67	.30	3.67	2071.80	2729.00
* 183479.000	13770.00	143.24	1.53	.28	5.24	2201.56	2729.00
* 183479.000	23316.00	146.69	3.41	.33	8.65	2468.18	2729.00
183529.000	5904.00	138.10	.00	.06	.00	1313.65	50.00
183529.000	10948.00	141.73	3.64	.02	3.64	2078.19	50.00
183529.000	13770.00	143.30	1.56	.02	5.20	2208.45	50.00
183529.000	23316.00	146.71	3.41	.01	8.61	2460.77	50.00
183533.000	5904.00	138.10	.00	.00	.00	1315.85	4.00
183533.000	10948.00	141.74	3.64	.00	3.64	2078.59	4.00
183533.000	13770.00	143.30	1.56	.00	5.20	2209.24	4.00
183533.000	23316.00	146.71	3.41	.00	8.61	2461.19	4.00
183534.000	5904.00	138.10	.00	.00	.00	1316.80	1.00
183534.000	10948.00	141.74	3.63	.00	3.63	2078.62	1.00
183534.000	13770.00	143.30	1.56	.00	5.20	2209.29	1.00
183534.000	23316.00	146.71	3.41	.00	8.61	2461.21	1.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
183535.000	5904.00	138.10	.00	.00	.00	1317.21	1.00
183535.000	10948.00	141.74	3.63	.00	3.63	2078.64	1.00
183535.000	13770.00	143.30	1.56	.00	5.20	2209.22	1.00
183535.000	23316.00	146.71	3.41	.00	8.61	2461.23	1.00
183537.000	5904.00	138.11	.00	.00	.00	1318.37	2.00
183537.000	10948.00	141.74	3.63	.00	3.63	2078.67	2.00
183537.000	13770.00	143.30	1.56	.00	5.19	2209.39	2.00
183537.000	23316.00	146.71	3.41	.00	8.60	2461.27	2.00
183540.000	5904.00	138.11	.00	.00	.00	1320.14	3.00
183540.000	10948.00	141.74	3.63	.00	3.63	2078.71	3.00
183540.000	13770.00	143.30	1.56	.00	5.19	2209.48	3.00
183540.000	23316.00	146.71	3.41	.00	8.60	2461.32	3.00
183545.000	5904.00	138.11	.00	.01	.00	1323.03	5.00
183545.000	10948.00	141.74	3.63	.00	3.63	2078.78	5.00
183545.000	13770.00	143.30	1.56	.00	5.19	2209.64	5.00
183545.000	23316.00	146.71	3.41	.00	8.60	2461.42	5.00
183555.000	5904.00	138.12	.00	.01	.00	1328.76	10.00
183555.000	10948.00	141.75	3.62	.00	3.62	2078.97	10.00
183555.000	13770.00	143.31	1.56	.00	5.18	2209.95	10.00
183555.000	23316.00	146.71	3.41	.00	8.59	2461.60	10.00
183575.000	5904.00	138.15	.00	.02	.00	1340.15	20.00
183575.000	10948.00	141.76	3.61	.01	3.61	2079.23	20.00
183575.000	13770.00	143.31	1.56	.01	5.17	2210.38	20.00
183575.000	23316.00	146.72	3.41	.01	8.57	2461.98	20.00
183850.000	5904.00	138.42	.00	.27	.00	1488.46	275.00
183850.000	10948.00	141.87	3.46	.12	3.46	2083.22	275.00
183850.000	13770.00	143.40	1.53	.09	4.99	2219.07	275.00
183850.000	23316.00	146.79	3.39	.07	8.37	2467.06	275.00
* 184810.000	5904.00	138.88	.00	.46	.00	801.81	960.00
184810.000	10948.00	142.17	3.29	.30	3.29	830.04	960.00
184810.000	13770.00	143.66	1.49	.26	4.78	842.81	960.00
184810.000	23316.00	147.03	3.37	.24	8.15	871.76	960.00
185105.000	5904.00	138.92	.00	.05	.00	500.00	295.00
185105.000	10948.00	142.22	3.29	.05	3.29	500.00	295.00
185105.000	13770.00	143.70	1.48	.04	4.78	500.00	295.00
185105.000	23316.00	147.06	3.36	.03	8.14	500.00	295.00
185255.000	5904.00	138.93	.00	.05	.00	236.00	150.00
185255.000	10948.00	142.26	3.33	.04	3.33	236.00	150.00
185255.000	13770.00	143.74	1.48	.03	4.76	236.00	150.00
185255.000	23316.00	147.09	3.35	.02	8.09	236.00	150.00

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	RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
	185345.000	5904.00	138.98	.00	.01	.00	236.00	90.00
	185345.000	10948.00	142.27	3.29	.01	3.29	236.00	90.00
	185345.000	13770.00	143.75	1.48	.02	4.77	236.00	90.00
	185345.000	23316.00	147.10	3.34	.03	8.12	236.00	90.00
	185495.000	5904.00	139.06	.00	.08	.00	500.00	150.00
	185495.000	10948.00	142.42	3.36	.15	3.36	500.00	150.00
	185495.000	13770.00	143.94	1.52	.19	4.88	500.00	150.00
	185495.000	23316.00	147.44	3.50	.75	9.39	500.00	150.00
	185770.000	5904.00	139.14	.00	.08	.00	1201.21	275.00
*	185770.000	10948.00	142.55	3.41	.13	3.41	1424.17	275.00
*	185770.000	13770.00	144.10	1.55	.16	4.96	1505.41	275.00
*	185770.000	23316.00	147.72	3.61	.27	8.57	1542.49	275.00
	187630.000	5904.00	139.39	.00	.24	.00	1083.59	1860.00
	187630.000	10948.00	142.82	3.44	.27	3.44	1268.91	1860.00
	187630.000	13770.00	144.38	1.55	.28	4.99	1365.14	1860.00
	187630.000	23316.00	148.04	3.67	.33	8.66	1644.84	1860.00
	188770.000	5904.00	139.55	.00	.16	.00	1438.66	1140.00
	188770.000	10948.00	143.00	3.45	.17	3.45	1841.66	1140.00
	188770.000	13770.00	144.56	1.56	.18	5.01	1957.76	1140.00
	188770.000	23316.00	148.26	3.70	.21	8.71	1884.71	1140.00
	189700.000	5904.00	139.66	.00	.12	.00	1235.83	930.00
*	189700.000	10948.00	143.12	3.46	.12	3.46	1266.05	930.00
*	189700.000	13770.00	144.68	1.56	.13	5.02	1279.06	930.00
*	189700.000	23316.00	148.41	3.73	.15	8.75	1310.14	930.00
*	190174.000	5904.00	139.72	.00	.06	.00	220.00	474.00
*	190174.000	10948.00	143.11	3.39	-.01	3.38	220.00	474.00
*	190174.000	13770.00	144.62	1.51	-.06	4.90	220.00	474.00
*	190174.000	23316.00	148.15	3.53	-.26	8.63	220.00	474.00
	190364.000	5904.00	139.79	.00	.07	.00	140.00	190.00
	190364.000	10948.00	143.12	3.33	.01	3.33	140.00	190.00
	190364.000	13770.00	144.67	1.46	-.05	4.79	140.00	190.00
	190364.000	23316.00	147.84	3.27	-.30	8.06	140.00	190.00
	190464.000	5904.00	140.00	.00	.21	.00	94.00	100.00
	190464.000	10948.00	143.48	3.48	.36	3.48	94.00	100.00
	190464.000	13770.00	145.02	1.54	.45	5.02	94.00	100.00
*	190464.000	23316.00	150.31	5.29	2.47	10.31	2818.16	100.00
	190496.000	5904.00	140.00	.00	.00	.00	94.00	32.00
	190496.000	10948.00	143.48	3.48	.00	3.48	94.00	32.00
	190496.000	13770.00	145.25	1.76	.22	5.25	94.00	32.00
	190496.000	23316.00	150.46	5.22	.15	10.47	2816.07	32.00

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	RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
*	190550.000	5904.00	140.13	.00	.13	.00	117.00	54.00
*	190550.000	10948.00	143.77	3.64	.29	3.64	117.00	54.00
*	190550.000	13770.00	145.62	1.85	.33	5.49	117.00	54.00
	190550.000	23316.00	150.39	4.78	-.07	10.27	2744.98	54.00
	190604.000	5904.00	140.26	.00	.13	.00	167.00	54.00
	190604.000	10948.00	144.04	3.78	.27	3.78	167.00	54.00
	190604.000	13770.00	145.87	1.83	.35	5.72	167.00	54.00
	190604.000	23316.00	150.41	4.44	.02	10.15	2707.75	54.00
	190636.000	5904.00	140.27	.00	.01	.00	167.00	32.00
	190636.000	10948.00	144.07	3.80	.03	3.80	167.00	32.00
	190636.000	13770.00	146.01	1.94	.03	5.74	167.00	32.00
	190636.000	23316.00	150.44	4.44	.03	10.17	2704.75	32.00
	190820.000	5904.00	140.42	.00	.15	.00	534.00	184.00
	190820.000	10948.00	144.32	3.90	.25	3.90	534.00	184.00
	190820.000	13770.00	146.31	1.98	.28	5.88	534.00	184.00
	190820.000	23316.00	150.61	4.30	.17	10.19	2703.78	184.00
	190920.000	5904.00	140.36	.00	.14	.00	700.00	100.00
*	190920.000	10948.00	144.33	3.97	.21	3.97	700.00	100.00
*	190920.000	13770.00	146.34	2.01	.24	5.98	700.00	100.00
	190920.000	23316.00	150.70	4.36	.09	10.15	2680.72	100.00
*	191500.000	5904.00	140.31	.00	.15	.00	1398.79	580.00
*	191500.000	10948.00	144.30	3.99	.17	3.99	1400.00	580.00
*	191500.000	13770.00	146.32	2.02	.17	6.01	1400.00	580.00
*	191500.000	23316.00	150.79	4.48	.09	10.08	2676.40	580.00
*	193640.000	5395.20	141.10	.00	.39	.00	1460.31	2340.00
	193640.000	10120.00	145.01	3.91	.31	3.91	2781.28	2340.00
	193640.000	12870.00	146.99	1.98	.27	5.88	2862.54	2340.00
*	193640.000	21837.00	150.87	3.88	.16	9.87	3032.10	2340.00
	195338.000	5395.20	141.46	.00	.36	.00	1851.83	1538.00
	195338.000	10120.00	145.25	3.79	.24	3.79	2284.80	1538.00
	195338.000	12870.00	147.17	1.92	.18	5.70	2504.29	1538.00
	195338.000	21837.00	151.12	3.95	.15	9.66	3089.84	1538.00
*	195504.000	5395.20	141.41	.00	.05	.00	148.00	126.00
	195504.000	10120.00	145.26	3.85	.01	3.85	2825.83	126.00
	195504.000	12870.00	147.18	1.92	.01	5.76	2948.67	126.00
	195504.000	21837.00	151.13	3.95	.01	9.72	3090.31	126.00
	195536.000	5395.20	141.43	.00	.01	.00	148.00	32.00
	195536.000	10120.00	145.49	4.06	.23	4.06	2827.48	32.00
	195536.000	12870.00	147.19	1.70	.01	5.76	2179.86	32.00
	195536.000	21837.00	151.13	3.94	.00	9.70	3086.98	32.00

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	RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
*	195770.000	5395.20	141.67	.00	.24	.00	1025.01	234.00
	195770.000	10120.00	145.54	3.87	.05	3.87	2444.59	234.00
	195770.000	12870.00	147.24	1.70	.05	5.57	2571.77	234.00
	195770.000	21837.00	151.16	3.92	.03	9.49	3069.20	234.00
	199970.000	5395.20	142.85	.00	1.19	.00	851.80	4200.00
	199970.000	10120.00	146.44	3.59	.81	3.59	2030.10	4200.00
	199970.000	12870.00	148.00	1.56	.76	5.14	2210.94	4200.00
	199970.000	21837.00	151.75	3.75	.59	8.90	2859.22	4200.00
*	209660.000	5395.20	143.82	.00	.96	.00	2942.27	9690.00
*	209660.000	10120.00	147.06	3.24	.62	3.24	3056.95	9690.00
*	209660.000	12870.00	148.53	1.47	.53	4.72	3154.62	9690.00
*	209660.000	21837.00	152.19	3.66	.44	8.38	3234.92	9690.00
*	210600.000	5395.20	143.74	.00	-.08	.00	746.70	940.00
*	210600.000	10120.00	147.06	3.32	.00	3.32	1086.63	940.00
*	210600.000	12870.00	148.56	1.50	.02	4.82	1818.99	940.00
*	210600.000	21837.00	152.26	3.70	.07	8.52	2059.84	940.00
	211350.000	5395.20	145.58	.00	1.84	.00	726.99	750.00
	211350.000	10120.00	148.20	2.62	1.15	2.62	1296.58	750.00
	211350.000	12870.00	149.47	1.27	.92	3.89	1398.24	750.00
	211350.000	21837.00	152.81	3.33	.55	7.23	1731.70	750.00
*	211580.000	5395.20	146.08	.00	.50	.00	528.20	150.00
	211580.000	10120.00	148.41	2.33	.20	2.33	688.01	150.00
	211580.000	12870.00	149.56	1.15	.09	3.48	761.81	150.00
	211580.000	21837.00	152.75	3.19	-.06	6.67	912.06	150.00
	211626.000	5395.20	146.38	.00	.30	.00	159.00	126.00
	211626.000	10120.00	149.71	2.33	.30	2.33	159.00	126.00
	211626.000	12870.00	150.06	1.35	.50	3.68	796.79	126.00
	211626.000	21837.00	153.18	3.13	.44	6.81	933.26	126.00
	211654.000	5395.20	146.48	.00	.02	.00	159.00	28.00
	211654.000	10120.00	149.23	2.83	.52	2.83	159.00	28.00
	211654.000	12870.00	151.12	1.89	1.06	4.72	838.25	28.00
	211654.000	21837.00	153.50	2.38	.31	7.10	940.12	28.00
	211880.000	5395.20	146.53	.00	.13	.00	568.01	226.00
	211880.000	10120.00	149.54	3.01	.32	3.01	760.05	226.00
	211880.000	12870.00	151.22	1.67	.09	4.69	848.29	226.00
	211880.000	21837.00	153.66	2.44	.16	7.13	955.67	226.00
*	214360.000	5395.20	147.62	.00	1.09	.00	954.16	2480.00
*	214360.000	10120.00	150.84	3.22	1.30	3.22	1063.96	2480.00
*	214360.000	12870.00	152.47	1.63	1.25	4.85	1141.04	2480.00
*	214360.000	21837.00	155.37	2.90	1.71	7.75	1359.58	2480.00

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	RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
	216920.000	5395.20	147.87	.00	.35	.00	3056.64	2560.00
*	216920.000	10120.00	151.17	3.20	.33	3.20	3398.87	2560.00
*	216920.000	12870.00	152.78	1.61	.31	4.81	3527.96	2560.00
*	216920.000	21837.00	155.76	2.98	.39	7.79	3652.29	2560.00
	217120.000	5395.20	147.99	.00	.02	.00	3283.37	200.00
	217120.000	10120.00	151.18	3.19	.01	3.19	3675.16	200.00
	217120.000	12870.00	152.79	1.62	.01	4.80	3871.65	200.00
	217120.000	21837.00	155.77	2.98	.01	7.78	4183.96	200.00
	217390.000	5395.20	148.05	.00	.05	.00	3290.49	270.00
	217390.000	10120.00	151.21	3.16	.03	3.16	3677.39	270.00
	217390.000	12870.00	152.81	1.60	.02	4.77	3873.27	270.00
	217390.000	21837.00	155.80	2.98	.02	7.75	4185.59	270.00
	217410.000	5395.20	148.05	.00	.00	.00	3292.36	20.00
	217410.000	10120.00	151.21	3.16	.00	3.16	3679.05	20.00
	217410.000	12870.00	152.81	1.60	.00	4.77	3874.75	20.00
	217410.000	21837.00	155.80	2.98	.00	7.75	4186.68	20.00
	217636.000	5395.20	148.09	.00	.05	.00	3297.30	226.00
	217636.000	10120.00	151.24	3.14	.02	3.14	3681.02	226.00
	217636.000	12870.00	152.83	1.60	.02	4.74	3876.85	226.00
	217636.000	21837.00	155.82	2.98	.02	7.72	4187.95	226.00
*	220520.000	5395.20	148.94	.00	.85	.00	878.81	2684.00
*	220520.000	10120.00	151.76	2.82	.53	2.82	1002.00	2684.00
*	220520.000	12870.00	153.26	1.50	.43	4.32	1094.19	2684.00
*	220520.000	21837.00	156.25	2.99	.43	7.30	2856.31	2684.00
	222812.000	5395.20	150.40	.00	1.45	.00	819.84	2292.00
	222812.000	10120.00	153.21	2.81	1.48	2.81	1007.67	2292.00
	222812.000	12870.00	154.63	1.41	1.36	4.23	1649.20	2292.00
	222812.000	21837.00	157.36	2.73	1.11	6.96	2150.43	2292.00
	223312.000	5395.20	150.80	.00	.40	.00	339.79	500.00
	223312.000	10120.00	153.54	2.74	.33	2.74	829.76	500.00
	223312.000	12870.00	154.97	1.38	.34	4.17	855.67	500.00

223312.000	21837.00	151.58	2.88	.21	8.77	2158.67	500.00
223445.000	5395.20	150.92	.00	.13	.00	152.17	133.00
223445.000	10120.00	152.61	2.72	.06	2.72	156.58	133.00
* 223445.000	12870.00	155.31	1.67	.34	4.39	2598.81	133.00
* 223445.000	21837.00	157.64	2.33	.09	6.72	2761.67	133.00
223475.000	5395.20	150.94	.00	.01	.00	152.21	30.00
223475.000	10120.00	152.67	2.74	.03	2.74	156.63	30.00
* 223475.000	12870.00	156.51	2.84	1.20	5.57	161.21	30.00
223475.000	21837.00	158.70	2.19	1.86	7.77	2742.66	30.00

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RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWNS	TOPWID	XLCH
223620.000	5395.20	151.07	.00	.13	.00	381.26	145.00
223620.000	10120.00	153.98	2.92	.31	2.92	386.10	145.00
223620.000	12870.00	156.85	2.86	.34	5.78	390.72	145.00
223620.000	21837.00	158.72	1.87	.01	7.65	2745.71	145.00
* 224000.000	5395.20	151.35	.00	.29	.00	1031.84	380.00
* 224000.000	10120.00	154.41	3.05	.42	3.05	1036.78	380.00
* 224000.000	12870.00	157.21	2.80	.36	5.86	1041.29	380.00
224000.000	21837.00	158.76	1.55	.04	7.40	2747.07	380.00
229080.000	5395.20	152.75	.00	1.40	.00	2380.69	5080.00
229080.000	10120.00	155.57	2.82	1.17	2.82	3118.48	5080.00
229080.000	12870.00	157.82	2.25	.71	5.17	3596.75	5080.00
* 229080.000	21837.00	159.36	1.43	.68	6.60	3724.84	5080.00
234920.000	5395.20	155.53	.00	2.27	.00	1206.61	5840.00
234920.000	10120.00	157.25	2.32	1.77	2.32	1412.98	5840.00
* 234920.000	12870.00	159.80	1.66	1.08	3.98	1498.78	5840.00
* 234920.000	21837.00	161.02	2.02	1.67	5.99	1580.80	5840.00
235026.000	5395.20	155.08	.00	.05	.00	1207.97	106.00
235026.000	10120.00	157.39	2.32	.05	2.32	1278.37	106.00
235026.000	12870.00	159.04	1.65	.04	3.97	1490.33	106.00
235026.000	21837.00	161.08	2.03	.05	6.00	1583.84	106.00
235054.000	5395.20	156.87	.88	.89	.00	1238.41	28.00
235054.000	10120.00	159.18	2.31	.29	2.21	1302.54	28.00
235054.000	12870.00	159.25	1.07	.21	3.18	1334.72	28.00
* 235054.000	21837.00	161.16	1.91	.08	5.09	1587.16	28.00
235156.000	5395.20	156.09	.00	.02	.00	1355.97	102.00
235156.000	10120.00	158.22	2.13	.04	2.13	1452.03	102.00
235156.000	12870.00	159.29	1.07	.04	3.20	1501.58	102.00
235156.000	21837.00	161.21	1.92	.05	5.12	1589.36	102.00
* 237560.000	5395.20	156.98	.00	.88	.00	1388.45	2404.00
* 237560.000	10120.00	159.31	2.34	1.09	2.34	1629.08	2404.00
* 237560.000	12870.00	160.41	1.09	1.11	3.43	1666.39	2404.00
* 237560.000	21837.00	162.68	2.28	1.47	5.70	1750.27	2404.00
* 240810.000	5395.20	158.93	.00	1.95	.00	1977.00	2450.00
* 240810.000	10120.00	160.99	2.06	1.67	2.06	2095.26	2450.00
* 240810.000	12870.00	161.98	.98	1.52	3.05	2151.66	2450.00
* 240810.000	21837.00	164.34	2.37	1.66	5.42	2268.50	2450.00
242510.000	5395.20	159.86	.88	.93	.00	1973.22	2500.00
242510.000	10120.00	161.93	2.07	.94	2.07	2091.93	2500.00
242510.000	12870.00	162.92	.99	.94	3.06	2148.25	2500.00
242510.000	21837.00	165.37	2.45	1.03	5.51	2270.30	2500.00

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RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWNS	TOPWID	XLCH
* 243920.000	5395.20	160.10	.00	.24	.00	1811.10	1410.00
* 243920.000	10120.00	162.23	2.13	.30	2.13	2208.40	1410.00
* 243920.000	12870.00	163.24	1.01	.32	3.14	2436.43	1410.00
* 243920.000	21837.00	165.75	2.51	.38	5.65	3957.01	1410.00
245078.000	5395.20	160.18	.00	.08	.00	2803.10	1158.00
245078.000	10120.00	162.35	2.17	.12	2.17	2843.49	1158.00
245078.000	12870.00	163.37	1.02	.13	3.19	2853.72	1158.00
245078.000	21837.00	165.91	2.54	.17	5.73	2878.14	1158.00
* 246700.000	5395.20	160.23	.00	.05	.00	2150.21	1630.00
* 246700.000	10120.00	162.60	2.37	.25	2.37	2482.53	1630.00
* 246700.000	12870.00	163.65	1.05	.28	3.42	2495.67	1630.00
* 246700.000	21837.00	166.25	2.59	.33	6.01	2544.92	1630.00
* 248150.000	5395.20	162.63	.98	2.39	.00	1278.42	1450.00
248150.000	10120.00	164.25	1.63	1.65	1.63	1341.76	1450.00
248150.000	12870.00	165.09	.84	1.64	2.47	1383.79	1450.00
248150.000	21837.00	167.42	2.34	1.19	4.81	1493.08	1450.00
249830.000	5395.20	164.31	.00	1.68	.00	1617.54	1680.00
249830.000	10120.00	166.13	1.82	1.98	1.82	1673.84	1680.00
249830.000	12870.00	166.99	.86	1.90	2.68	1699.25	1680.00
249830.000	21837.00	169.33	2.34	1.90	5.02	1811.79	1680.00
* 251060.000	5395.20	165.09	.00	.78	.00	1841.83	1230.00
* 251060.000	10120.00	166.93	1.83	.81	1.83	1933.10	1230.00
* 251060.000	12870.00	167.82	.88	.83	2.72	2002.66	1230.00
* 251060.000	21837.00	170.19	2.37	.86	5.10	2141.98	1230.00

251227.000	5395.20	165.15	.00	.05	.00	1738.81	167.00
251227.000	10120.00	167.01	1.86	.06	1.86	1955.09	167.00
251227.000	12870.00	167.89	.88	.07	2.74	2006.80	167.00
251227.000	21837.00	170.26	2.37	.09	5.12	2140.41	167.00
251253.000	5395.20	165.65	.00	.51	.00	1755.09	26.00
251253.000	10120.00	167.17	1.51	.16	1.51	1964.24	26.00
251253.000	12870.00	167.96	.80	.07	2.31	2011.84	26.00
* 251253.000	21837.00	170.26	2.30	.09	4.81	2146.41	26.00
251360.000	5395.20	165.68	.00	.03	.00	1878.88	107.00
251360.000	10120.00	167.20	1.52	.04	1.52	1966.39	107.00
251360.000	12870.00	168.08	.88	.04	2.40	2013.33	107.00
251360.000	21837.00	170.31	2.23	.05	4.63	2149.04	107.00
251560.000	5395.20	165.72	.00	.04	.00	1879.32	200.00
251560.000	10120.00	167.27	1.55	.05	1.55	1970.29	200.00
251560.000	12870.00	168.08	.81	.06	2.35	2019.19	200.00
251560.000	21837.00	170.40	2.32	.09	4.68	2154.33	200.00

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RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWNS	TOPWID	XLCH
* 252550.000	5395.20	166.13	.00	.41	.00	1561.67	1990.00
* 252550.000	10120.00	167.85	1.72	.56	1.72	2177.02	1990.00
* 252550.000	12870.00	168.69	.84	.61	2.56	2208.71	1990.00
* 252550.000	21837.00	171.01	2.32	.61	4.88	2485.63	1990.00
* 256530.000	5395.20	169.71	.00	3.58	.00	510.33	2980.00
256530.000	10120.00	172.16	2.45	4.31	2.45	675.28	2980.00
256530.000	12870.00	173.09	.94	4.40	3.39	738.33	2980.00
256530.000	21837.00	175.22	2.22	4.31	5.61	928.78	2980.00
* 261680.000	5395.20	171.76	.00	2.05	.00	1874.92	5150.00
* 261680.000	10120.00	174.54	2.78	2.38	2.78	2082.20	5150.00
* 261680.000	12870.00	175.69	1.15	2.68	3.93	2253.96	5150.00
* 261680.000	21837.00	178.43	2.80	3.18	6.74	2674.70	5150.00
* 264830.000	5395.20	172.66	.00	.91	.00	501.85	3150.00
* 264830.000	10120.00	175.50	2.84	.96	2.84	625.97	3150.00
* 264830.000	12870.00	176.70	1.19	1.01	4.03	678.33	3150.00
* 264830.000	21837.00	179.62	2.92	1.13	6.96	806.16	3150.00
* 265780.000	5395.20	173.23	.88	.58	.00	314.98	950.00
* 265780.000	10120.00	176.31	3.08	.81	3.08	404.64	950.00
* 265780.000	12870.00	177.61	1.30	.92	4.37	447.54	950.00
265780.000	21837.00	180.84	3.22	1.22	7.58	755.35	950.00
265908.000	5395.20	173.33	.88	.12	.00	110.00	128.00
265908.000	10120.00	176.36	3.00	.06	3.00	110.00	128.00
265908.000	12870.00	177.59	1.23	-.02	4.22	110.00	128.00
265908.000	21837.00	181.17	3.58	.34	7.80	765.45	128.00
265932.000	5395.20	173.38	.00	.01	.00	110.00	24.00
265932.000	10120.00	176.69	3.31	.32	3.31	110.00	24.00
265932.000	12870.00	178.29	1.60	.69	4.91	110.00	24.00
265932.000	21837.00	183.26	5.07	2.18	9.98	838.15	24.00
266050.000	5395.20	173.53	.00	.15	.00	323.67	118.00
266050.000	10120.00	177.12	3.59	.44	3.59	431.36	118.00
266050.000	12870.00	178.92	1.80	.63	5.39	490.65	118.00
266050.000	21837.00	183.45	4.53	.09	9.92	839.29	118.00
266420.000	5395.20	173.93	.00	.39	.00	323.90	380.00
266420.000	10120.00	177.59	3.66	.47	3.66	436.98	380.00
266420.000	12870.00	179.39	1.80	.47	5.46	567.68	380.00
266420.000	21837.00	183.87	4.48	.42	9.95	840.61	380.00
267638.000	5395.20	175.14	.00	1.21	.00	445.26	1208.00
267638.000	10120.00	178.97	3.83	1.38	3.83	581.63	1208.00
267638.000	12870.00	180.76	1.79	1.37	5.62	645.97	1208.00
267638.000	21837.00	185.15	4.39	1.27	10.01	921.27	1208.00

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RECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWNS	TOPWID	XLCH
267815.000	5395.20	175.29	.00	.15	.00	148.00	177.00
267815.000	10120.00	179.03	3.74	.06	3.74	148.00	177.00
267815.000	12870.00	180.76	1.73	.00	5.47	148.00	177.00
267815.000	21837.00	185.27	4.51	.13	9.98	887.41	177.00
267845.000	5395.20	175.31	.00	.02	.00	148.00	30.00
267845.000	10120.00	179.06	3.75	.03	3.75	148.00	30.00
267845.000	12870.00	181.21	2.15	.45	5.90	148.00	30.00
267845.000	21837.00	187.15	5.94	1.88	11.84	1044.27	30.00
267940.000	5395.20	175.37	.00	.06	.00	421.60	95.00
267940.000	10120.00	179.29	3.92	.23	3.92	561.29	95.00
267940.000	12870.00	181.55	2.26	.34	6.18	642.02	95.00
267940.000	21837.00	187.18	5.64	.23	11.81	1025.60	95.00
268647.000	5395.20	178.17	.00	.80	.00	449.51	707.00
268647.000	10120.00	183.05	4.88	.15	4.88	588.33	707.00
268647.000	12870.00	185.20	2.15	.65	6.99	665.27	707.00
268647.000	21837.00	187.65	5.45	.46	11.48	1049.03	707.00
268648.000	5395.20	178.21	.00	.00	.00	409.67	1.00
268648.000	10120.00	183.09	4.88	.00	4.88	551.62	1.00

268649.000	12870.00	182.24	2.14	.04	6.02	823.47	1.00
268649.000	21837.00	187.65	5.42	.01	11.44	1211.88	1.00
268651.000	5395.20	176.22	.00	.00	.00	409.76	3.00
268651.000	10120.00	180.10	3.88	.00	3.86	559.69	3.00
268651.000	12870.00	182.24	2.14	.00	6.02	823.53	3.00
268651.000	21837.00	187.66	5.42	.00	11.44	1212.58	3.00
268652.000	5395.20	176.19	.00	-.03	.00	450.35	1.00
268652.000	10120.00	180.07	3.88	-.03	3.86	589.04	1.00
268652.000	12870.00	182.22	2.15	-.02	6.03	665.88	1.00
268652.000	21837.00	187.65	5.44	.00	11.46	1049.49	1.00
268653.000	5395.20	176.19	.00	.00	.00	450.38	1.00
268653.000	10120.00	180.07	3.88	.00	3.88	589.07	1.00
268653.000	12870.00	182.22	2.15	.00	6.03	665.91	1.00
268653.000	21837.00	187.65	5.44	.00	11.46	1049.51	1.00
268654.000	5395.20	176.19	.00	.00	.00	450.41	1.00
268654.000	10120.00	180.07	3.88	.00	3.88	589.11	1.00
268654.000	12870.00	182.22	2.15	.00	6.03	665.94	1.00
268654.000	21837.00	187.65	5.43	.00	11.46	1049.34	1.00
268655.000	5395.20	176.19	.00	.00	.00	450.45	1.00
268655.000	10120.00	180.07	3.88	.00	3.88	589.14	1.00
268655.000	12870.00	182.22	2.15	.00	6.03	665.97	1.00
268655.000	21837.00	187.65	5.43	.00	11.46	1049.37	1.00

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SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFWS	TOPWID	XLCH
268657.000	5395.20	176.19	.00	.00	.00	450.51	2.00
268657.000	10120.00	180.07	3.88	.00	3.88	589.21	2.00
268657.000	12870.00	182.22	2.15	.00	6.03	666.03	2.00
268657.000	21837.00	187.66	5.43	.00	11.46	1049.43	2.00
268660.000	5395.20	176.20	.00	.00	.00	450.61	3.00
268660.000	10120.00	180.08	3.88	.00	3.88	589.38	3.00
268660.000	12870.00	182.22	2.15	.00	6.03	666.11	3.00
268660.000	21837.00	187.66	5.43	.00	11.46	1049.53	3.00
268700.000	5395.20	176.24	.08	.04	.00	451.89	40.00
268700.000	10120.00	180.11	3.88	.04	3.88	590.57	40.00
268700.000	12870.00	182.26	2.14	.03	6.02	667.25	40.00
268700.000	21837.00	187.68	5.42	.02	11.45	1050.73	40.00
269000.000	5395.20	176.58	.00	.21	.00	461.48	300.00
269000.000	10120.00	180.38	3.88	.21	3.88	600.07	300.00
269000.000	12870.00	182.50	2.12	.24	6.00	675.77	300.00
269000.000	21837.00	187.86	5.36	.18	11.36	1059.78	300.00

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