APPENDIX A

Supporting Tables

TABLE A-1Wetland Types Predicted in the Source Basin

Wetland Types / Natural Communities	Location (NC County)	Location / Soils / Hydrology	Vegetation / Dominant Trees
Piedmont / Low Mountain Alluvial Forest	Mecklenburg, Iredell, York (SC)	Palustrine. Floodplains seasonally or intermittently flooded. Stream flow is moderate. Soils are alluvial.	Mixture of bottomland hardwood and mesophytic trees with lush shrubs, vines and herb layers. Dominant trees include river birch, sycamore, tuliptree, sweetgum, American elm, sugarberry, black walnut, green ash, bitternut hickory, red hickory, shingle oak, red maple, white ash, silverbell. Understory dominated by ash-leaf maple, box elder.
Low Elevation Seep	Catawba, Iredell	Palustrine. Permanently saturated mucky soils with no standing water. Seepages and springs at edges of slopes or edges of floodplains.	Partly shaded thin canopy of red maple and willow oak with diverse herbaceous wetland vegetation including lizard's tail, orange jewelweed, cinnamon fern, and royal fern. Sites are important breeding and foraging sites for amphibians.
Hillside Seepage Bog	Iredell	Palustrine. Permanently saturated mucky soils to intermittently dry. Seepages on slopes or edges of bottomlands.	Open, dense herbaceous interior and forested outer edge. Outer trees include red maple, sweetgum, tulip poplar, and black gum. Interior species include sedges, pipeworts, pitcher plants, grass-pink, cowbane, ferns, sneezeweed, ragwort, and golden club.
Upland Depression Swamp Forest	Iredell, Mecklenburg, York (SC)	Palustrine. Poorly drained upland flats or depressions. Seasonably or intermittently flooded or saturated by ponded rain, not seepage.	Closed tree canopy dominated by overcup oak and willow oak. Other trees can include water oak, sweetgum, red maple, tulip poplar, swamp black gum, swamp white oak, and shagbark hickory. Sparse shrubs and herbs, with abundant mosses. Vines are prolific in disturbed areas.

Sources: NC NHP, April 1999; Schafale, 1990.

List of NC SNHA Wetlands Sites in Source Basin

List of NC SNHA wetland sites that were identified as being within the adjacent USGS quadrangles that compose the North Carolina portion of the source basin project area:

- Kidd Road Upland Swamp, Lake Norman, Northern Mecklenburg County, Upland Depression Swamp Forest
- Walker Branch Swamps, Lake Wylie, Southern Mecklenburg County, Upland Depression Swamp Forest
- Sledge Road Upland Swamp, Lake Wylie, Southern Mecklenburg County, Upland Depression Swamp Forest
- Beatties Ford Memorial Gardens, Mountain Island Lake, Mecklenburg County, Piedmont / Low Mountain Alluvial Forest

TABLE A-2 Land Cover/GIS Queries

		Source Basin A	Receiving Basin Area (acres)			
	Lake Norman	Lake Norman Dam to Mountain Island Lake dam	Mountain Island Lake Dam to beginning of Lake Wylie	Lake Wylie	Meck. Co. Land	Mallard Creek/ Rocky River
NC CGIA Land Cover Type (1996)						
Forest						
Bottomland Forest/Hardwood Swamps	27	4	254	1,349	449	2,990
Mixed Hardwoods/Conifers	7,336	352	564	1,178	4,201	172
Mixed Upland Hardwoods	24,857	4,342	3,457	2,225	47,724	10,199
Mountain Conifers	342	16	11	109	61	3
Needleleaf Deciduous	0	0	0	0	0	91
Oak/Gum/Cypress	0	0	0	0	0	35
Other Broadleaf Deciduous Forests	3	0	7	0	7	20
Other Needle leaf Evergreen Forests	17	3	0	0	23	0
Southern Yellow Pine	4,141	464	501	3,217	5,483	1,692
Agriculture						
Cultivated	1,026	54	0	10	1,883	3,134
Open						
Deciduous Shrubland	195	7	3	132	71	68
Evergreen Shrubland	506	8	3	0	179	9
Exposed Rock	4	19	3	0	0	0

TABLE A-2 Land Cover/GIS Queries

		Source Basin A	Receiving Basi	in Area (acres)		
	Lake Norman	Lake Norman Dam to Mountain Island Lake dam	Mountain Island Lake Dam to beginning of Lake Wylie	Lake Wylie	Meck. Co. Land	Mallard Creek/ Rocky River
Managed Herbaceous Cover	11,768	489	812	750	21,350	5,760
Mixed Shrubland	0	0	0	5	0	0
Not within database	1	0	0	0	0	0
Unconsolidated Sediment	0	0	24	0	8	25
Unmanaged Herbaceous Upland	140	42	6	0	97	30
Urban						
High Intensity Developed	1,290	186	960	439	4,761	161
Low Intensity Developed	943	40	67	52	2,901	30
Water Bodies	31,086	2,099	2,000	5,762	332	97
SC Land Cover (1989-90)						
Agriculture	0	0	0	399	0	0
Forest	0	0	0	12,715	0	0
Open						
Barren/disturbed	0	0	0	110	0	0
Scrub/Shrub	0	0	0	7	0	0
Urban	0	0	0	353	0	0
Water	0	0	0	3,203	0	0

TABLE A-2 Land Cover/GIS Queries

		Source Basin A	Receiving Basi	n Area (acres)		
	Lake Norman	Lake Norman Dam to Mountain Island Lake dam	Mountain Island Lake Dam to beginning of Lake Wylie	Lake Wylie	Meck. Co. Land	Mallard Creek/ Rocky River
TOTAL LAND COVER						
Forest	36,724	5,181	4,794	20,792	57,948	15,202
Agriculture	1,026	54	0	409	1,883	3,134
Open	12,614	566	852	1,003	21,705	5,892
Urban	2,233	227	1,027	844	7,662	191
TOTAL Land	52,597	6,029	6,674	23,048	89,198	24,420
TOTAL Water	31,086	2,099	2,000	8,965	332	97
TOTAL	83,683	8,128	8,674	32,013	89,530	24,516
Wetlands						
Total wetlands	31,039	2,509	2,020	10,386	1,723	987
L2US & L2UB	225	9	87	1	0	0
L1UB	30,344	2,039	1,716	10,073	18	0
Public Lands						
Meck. Co. Parks (total number)	3	3	2	2	11	0
Meck. Co. Greenways	0	0	0	0	435	0
NC CGIA State Parks	1,440	0	0	0	0	0

TABLE A-2 Land Cover/GIS Queries

		Source Basin A	Receiving Basi	in Area (acres)		
	Lake Norman	Lake Norman Dam to Mountain Island Lake dam	Mountain Island Lake Dam to beginning of Lake Wylie	Lake Wylie	Meck. Co. Land	Mallard Creek/ Rocky River
SC Public Lands	0	0	0	0	0	0
Total Land Area of Study Area (no Water Bodies)	52,596	6,029	6,674	23,048	89,198	24,420
Area of Water Bodies (Lakes only)	31,086	2,099	2,000	8,965	332	97
Land Use / Cover Totals						
Туре	Source	Receiving				
Forest	67,491	73,150				
Agriculture	1,490	5,017				
Open	15,036	27,597				
Urban	4,331	7,853				
Water	44,150	429				
TOTAL	132,498	114,046				

TABLE A-3Population Growth and Density for Subbasins 32, 33 & 34 (Source Basin)

	Subbasin 32 (Lake Norman and Surrounding)	Subbasin 33 (Mountain Island Lake and Surrounding)	Subbasin 34 (Lake Wylie and Surrounding)
Population Growth			
1970 Population	101,842	30,127	281,144
1980 Population	126,998	39,067	348,562
1990 Population	151,979	47,301	435,725
1970-1980 Annual Growth Rate (average %)	2.23	2.63	2.17
1980-1990 Annual Growth Rate (average %)	1.81	1.93	2.26
Population Density			
1970 Population Density (persons/sq. mi.)	157	139	885
1980 Population Density (persons/sq. mi.)	196	180	1,098
1990 Population Density (persons/sq. mi.)	234	218	1,372

Source: (NC DWQ, 1995)

TABLE A-4 Archaeological and Historic Resources by County (NC only)

County	Number of Prehistoric and Historic Sites (from SHPO Survey)	Number of National Register Historic Properties	Number of Historic Districts	Types of Historic Places
Catawba	200	45	8	Covered bridges, plantations, estates, mills, schools, Hickory Town Hall
Iredell	200+	38	7	Farm houses, businesses and churches
Lincoln	146	16	0	Farms, plantations, churches, cemeteries, camp meeting grounds, Lincoln County Courthouse
Gaston	250	14	3	Cathedral, estates, banks, schools, churches, Post Office
Mecklenburg	800	50	6	(230 local historic landmarks), mills, plantations, halls, stores, depots

Source: NC State Historic Preservation Office, 1996

Table A-5Natural Communities in the Source Basin

			County			
Natural Community	Catawba	Iredell	Mecklenburg	Gaston	Lincoln	York
Piedmont / Low Mtn Alluvial Forest		Х	Х			Х
Low Elevation Seep	Χ	Х				
Hillside Seepage Bog		Х				
Upland Depression Swamp Forest		Χ	Х			Χ
Dry-Mesic Oak Hickory	X	Χ		Х		
Chestnut Oak	Χ	Χ				
Basic Oak Hickory			Χ	Х		
Dry Oak Hickory	Χ	Х		Х		
Basic Mesic Forest (Piedmont)		Χ			X	
Mesic Mixed Hardwood	Х	Χ	Х	Х	Х	
Pine-Oak Heath	Χ			Х		
Piedmont Monadnock		Х		X		
Piedmont / Coastal Plain Acidic Cliff		Χ				
Piedmont/ Coastal Plain Heath Bluff		Χ				
Granitic Flatrock				X		
Low Elevation Rocky Summit				X		
Xeric Hardpan Forest			Χ			

Source: NC NHP, April 1999

SNHAs in the Source Basin

SNHAs in the source basin, as provided by the Natural Heritage Program (see letter in Appendix B):

- Upland Depression Swamp SNHAs:
 - Porter Road Swamps
 - Westinghouse Boulevard
 - Kidd Road
 - Walker Branch Swamps
 - Sledge Road Upland Swamp
- Basic Oak Hickory Forest SNHAs:
 - Mt. Olive Church Basic Forest
 - Walker Branch Swamps
 - Sledge Road Upland Swamp
 - Stanley Basic Forest
 - Beatties Ford Memorial Gardens
- Other SNHAs, Rare Plant Sites and Wildlife Refuges in proximity to the source basin include:
 - McDowell/Torrence Creeks Confluence Slope
 - Rankin Hardwood Forest
 - Cowans Ford Wildlife Refuge near Mountain Island Lake
 - Winget Rare Plant Site
 - Mountain Island Lake Dam Rare Plant Site
 - Catawba Wildflower Glen
 - Shuffletown Powerline Rare Plant Site
 - Gar Creek Rare Plant Site
 - McCoy Road Sunflower Park SNHA
 - Latta Plantation County Park SNHA

TABLE A-6
Threatened, Endangered and Sensitive Species
Potentially Occurring in Source Basin

Common Name	Scientific Name	NC State Status	SC State Status	Federal Status	Known Location
Invertebrates					
Carolina creekshell	Villosa vaughaniana	Special concern		Species of concern	Charlotte & Mecklenburg County
Eastern creekshell	Villosa vaughaniana	Special concern		Species of concern	Mecklenburg County
Carolina Elktoe	Alasmidonta robusta	Extirpated			Mecklenburg County
Long Dash	Polites mystic	Significantly Rare			Gaston County
Dwarf Threetooth	Triodopsis fulcidens	Special concern			Lincoln and Catawba Counties
Pee Dee crayfish ostracod	Dactylocyther e peedeensis			Species of concern	Catawba County
Vertebrates					
Highfin Carpsucker	Carpiodes velifer	Species of concern			Lake Norman, Mecklenburg, Catawba, Iredell and Gaston Counties
Loggerhead Shrike	Lanius Iudovicianus	Species of concern			Mecklenburg, Catawba, Gaston, Lincoln and Iredell Counties
Santee Chub – Piedmont	Cyprinella zanema	Significantly rare			Mecklenburg, Catawba and Lincoln Counties
Bog turtle	Clemmys muhlenbergii	Threatened		Threatened	Iredell and Gaston Counties
Carolina Darter	Etheostoma collis	Special concern			Mecklenburg County
Vascular Plants					
Schweinitz's sunflower	Helianthus schweinitzii	Endangered		Endangered	Several Mecklenburg County sites; Three sites in York County, SC

TABLE A-6
Threatened, Endangered and Sensitive Species
Potentially Occurring in Source Basin

Common Name	Scientific Name	NC State Status	SC State Status	Federal Status	Known Location
Northern Cup- plant	Silphium perfoliatum	Significantly rare			Gaston and Mecklenburg Counties
Georgia aster	Aster georgianus	Candidate		Species of concern	Mecklenburg County; Shuffletown Powerline Rare Plant Site SNHA
Tall larkspur	Delphinium exaltatum			Species of concern	Mecklenburg County
Smooth coneflower	Echinacea laevigata			Endangered	Mecklenburg County; Shuffletown Powerline Rare Plant Site SNHA
Virginia quillwort	Isoetes virginica			Species of concern	Mecklenburg County
Heller's trefoil	Lotus helleri			Species of concern	Mecklenburg County
Michaux's sumac	Rhus michauxii			Endangered	Mecklenburg County
Bigleaf magnolia	Magnolia macrophylla	Significantly rare			Gaston County; Stanley Basic Forest SNHA, Rankin Hardwood Forest SNHA
Magnolia vine	Schisandra glabra	Threatened – special concern			Gaston and Mecklenburg Counties

Source: USFWS 1999 letter in Appendix B; NCNHP 1999; SCHTP, 1999; Federal Status: Endangered = in danger of extinction throughout all or a significant portion of its range; Threatened = likely to become endangered within the foreseeable future throughout all or a significant portion of its range; Species of Concern = a species that may or may not be listed as threatened or endangered in the future (candidate species).

TABLE A-7 Characteristics of Lake Norman, Mountain Island Lake, and Lake Wylie

	Lake Norman	Mountain Island Lake	Lake Wylie
Year Completed	1967	1923	1904-1928
Drainage Area (square miles)	1793	1860	3020
Average Depth (feet)	34	16	23
Maximum Depth (feet)	120	30	92
Shoreline Length (miles)	520	61	330
Surface Area (square miles)	51	5	19
Volume (billion gallons)	356.1	18.7	90.5

TABLE A-8Wetland Types Predicted in the Receiving Basin

Wetland Types / Natural Communities	Location (NC County)	Location / Soils / Hydrology	Vegetation / Dominant Trees
Piedmont / Low Mountain Alluvial Forest	Mecklenburg, Iredell, York (SC)	Palustrine. Floodplains seasonally or intermittently flooded. Stream flow is moderate. Soils are alluvial.	Mixture of bottomland hardwood and mesophytic trees with lush shrubs, vines and herb layers. Dominant trees include river birch, sycamore, tuliptree, sweetgum, American elm, sugarberry, black walnut, green ash, bitternut hickory, red hickory, shingle oak, red maple, white ash, silverbell. Understory dominated by ash-leaf maple, box elder.
Upland Depression Swamp Forest	Iredell, Mecklenburg, York (SC)	Palustrine. Poorly drained upland flats or depressions. Seasonably or intermittently flooded or saturated by ponded rain, not seepage.	Closed tree canopy dominated by overcup oak and willow oak. Other trees can include water oak, sweetgum, red maple, tulip poplar, swamp black gum, swamp white oak, and shagbark hickory. Sparse shrubs and herbs, with abundant mosses. Vines are prolific in disturbed areas.

Sources: NC NHP, 1999; Schafale, 1990.

TABLE A-9Population Growth and Density for Subbasins 11 & 12 (Receiving Basin)

	Subbasin 11 (Portions of Mecklenburg, Iredell, Rowan and Cabarrus Counties)	Subbasin 12 (Portions of Mecklenburg, Rowan, Union and Stanly Counties)
Population Growth		
1970 Population	67,277	107,947
1980 Population	64,388	107,706
1990 Population	78,047	125,021
1970-1980 Annual Growth Rate (average %)	- 0.4%	- 0.02%
1980-1990 Annual Growth Rate (average %)	1.9%	1.5%
Population Density		
1970 Population Density (persons/sq. mi.)	243	249
1980 Population Density (persons/sq. mi.)	232	248
1990 Population Density (persons/sq. mi.)	282	288

Source: NC DWQ, 1997

TABLE A-10Forest Natural Communities in the Receiving Basin

	County				
Natural Forest Community	Mecklenburg	Cabarrus	Union	Stanly	
Basic Mesic Forest (Piedmont Subtype)		Х			
Mesic Mixed Hardwood (Piedmont Subtype)	Х			Х	
Basic Oak-Hickory	X	Х	Х	X	
Dry Oak Hickory		Χ	Х		
Granitic Flatrock		Χ			
Xeric Hardpan		Χ	Х	X	
Dry Mesic Oak-Hickory				X	
Piedmont Mafic Cliff				X	
Piedmont/ Coastal Plain Heath Bluff				X	
Piedmont Monadnock				X	

Source: NC NHP 1999 letter in Appendix B

TABLE A-11Natural Communities Potentially in the Receiving Basin

	County				
Natural Community	Mecklenburg	Cabarrus	Union	Stanly	
Piedmont / Low Mountain Alluvial Forest	Х			Х	
Upland Depression Swamp Forest	X			X	
Dry-Mesic Oak Hickory				Χ	
Basic Oak Hickory	X	X	Χ	Х	
Dry Oak Hickory		X	Χ		
Basic Mesic Forest (Piedmont)		X			
Mesic Mixed Hardwood	X			Х	
Piedmont Monadnock				Χ	
Piedmont Mafic Cliff				Х	
Piedmont/ Coastal Plain Heath Bluff				Х	
Granitic Flatrock		Χ			
Xeric Hardpan Forest	X	Χ	Χ	Х	

Sources: NC NHP, 1999, as provided in Appendix B

SNHAs in the Receiving Basin

SNHAs in the receiving basin, as provided by the Natural Heritage Program (see letter in Appendix B):

- Upland Depression Swamp SNHAs:
 - Back Creek Swamp in Mecklenburg County
- Basic Oak Hickory Forest SNHAs:
 - University Meadows Basic Forest in Mecklenburg County
 - Charlotte Speedway Hardwood Forest in Mecklenburg County
- Other SNHAs, Rare Plant Sites, Bird Sanctuaries and Wildlife Refuges in receiving basin project area:
 - Rocky River / Harrisburg Bottomland in Cabarrus County
 - Wading Bird Rookery in Cabarrus County

TABLE A-12
Threatened, Endangered and Sensitive Species
Potentially Occurring in Receiving Basin

Common Name	Scientific Name	NC State Status	Federal Status	Location
Invertebrates				
Carolina creekshell	Villosa vaughaniana	Special concern	Species of concern	Mallard Creek (Mecklenburg County), Back Creek Swamp SNHA
Savannah lilliput	Toxolasma pullus	Threatened	Species of concern	North Fork Crooked Creek (Mecklenburg County)
Pee Dee crayfish ostracod	Dactylocythere peedeensis		Species of concern	Cabarrus County
Carolina Darter	Etheostoma collis	Special concern		Mecklenburg, Union and Cabarrus Counties, North Fork Crooked Creek
Vascular Plants				
Schweinitz's sunflower	Helianthus schweinitzii	Endangered	Endangered	Cabarrus, Union & Mecklenburg Counties
Heller's (Carolina birdfoot) trefoil	Lotus helleri	Candidate	Species of concern	Cabarrus, Union & Mecklenburg Counties
Georgia aster	Aster georgianus		Species of concern	Mecklenburg & Union Counties
Tall larkspur	Delphinium exaltatum		Species of concern	Mecklenburg County
Smooth coneflower	Echinacea laevigata		Endangered	Mecklenburg County
Virginia quillwort	Isoetes virginica		Species of concern	Mecklenburg & Union Counties; Back Creek Swamp SNHA;
Michaux's sumac	Rhus michauxii		Endangered	Mecklenburg County
Missouri rockcress	Arabis missouriensis	Candidate		Kinea Slate & Rock Hole Creek Natural Areas (Stanly County)
Piedmont aster	Aster mirabilis	Candidate		и
Wright's cliff- brake	Pellaea wrightiana	Endangered		и
Southern anemone	Anemone berlandieri	Candidate		и
Piedmont indigo-bush	Amorpha schwerinii	Significantly rare		и

TABLE A-12
Threatened, Endangered and Sensitive Species
Potentially Occurring in Receiving Basin

Common	Scientific	NC State	Federal	Location
Name	Name	Status	Status	
Eastern shooting star	Dodecatheon meadia	Significantly rare		Kinea Slate & Rock Hole Creek Natural Areas (Stanly County)

Sources: USFWS 1999 letter provided in Appendix B; NC NHP 1999; Federal <u>Status</u>: Endangered = in danger of extinction throughout all or a significant portion of its range; Threatened = likely to become endangered within the foreseeable future throughout all or a significant portion of its range; Species of Concern = a species that may or may not be listed as threatened or endangered in the future (candidate species).

APPENDIX B

Resource Agencies Consultation

TABLE B-1Resource Agencies

Resource Agencies Contacted	Date of Comment Submittal		Concerns Addressed in Letter (attached)	Section of EA Where Concerns are Addressed
Mecklenburg County Department of Environmental Protection	Phone call:	May 3, 1999	None. See attached phone record	
	Letter dated:	November 19, 1999	MCDEP concurs with the EA findings and mitigation plan	
North Carolina Department of	Letter dated:	April 30, 1999	List of rare species; impacts on	3.1.3; 3.2.3; and Sections
Environment and Natural Resources: Division of Parks and Recreation	Memorandum dated	August 16, 1999	species of concern, secondary impacts; mitigation plan	4, 5 & 6
	Telephone Record dated:	September 20, 1999		
North Carolina Department of Environment and Natural Resources: Division of Pollution Prevention	Letter dated:	May 12, 1999	No concerns submitted	
North Carolina Department of	Informational documents received		General analysis of secondary	All sections
Environment and Natural Resources: Division Water Quality	Memorandum dated:	August 16, 1999	impacts; mitigation plan; project description; IBT calculations	
	Telephone Record dated:	September 15, 1999	·	
North Carolina Department of	Scoping document development		Scoping Document attached	All sections
Environment and Natural Resources: Division of Water Resources	Meeting Summary dated:	September 23, 1999		
North Carolina Department of Environment and Natural Resources: Office of the Secretary	Memorandum dated:	August 23, 1999	Forwarded comments from DWQ (8-16-99), DPR (8-16-99) and WRC (8-9-99)	All Sections
North Carolina Wildlife Resources	Letter dated:	April 23, 1999	Impacts on species of concern,	2.3; 3.1.2; 3.2.2; 3.1.3; and Sections 4, 5 & 6
Commission	Memorandum dated:	August 9, 1999	recreation, and fisheries; direct/indirect impacts; alternatives;	
	Telephone Record dated:	September 14, 1999	water conservation; Three-County facility	

TABLE B-1Resource Agencies

Resource Agencies Contacted	Date of Co	mment Submittal	Concerns Addressed in Letter (attached)	Section of EA Where Concerns are Addressed
South Carolina Department of Health	Letter dated:	May 10, 1999	Lake surface elevations;	3.1.4; and 5
and Environmental Control: Bureau of Water	Email dated:	June 1, 1999	downstream flow releases, nutrients	
South Carolina Department of Natural Resources	Letter dated:	May 7, 1999	Printouts of species occurrences	3.1.3
US Department of Interior: Fish and Wildlife Service	No submittal		No concerns submitted. See attached phone record	
US Department of Interior: Fish and Wildlife Service ¹	Letter dated:	March 12, 1999	Species of concern; Three-County facility; secondary impacts	2.3; 3.1.3; 3.2.3; and Sections 4, 5 & 6
North Carolina Department of Environment and Natural Resources: Division of Water Quality	Letter dated:	May 10, 2000	Letter of concurrence	
North Carolina Wildlife Resources Commission	Letter dated:	August 1, 2000	Proposed mitigation	Section 6; Response letter from CMU dated 12/7/00 in Appendix B
North Carolina Department of Environment and Natural Resources: Office of the Secretary	Letter undated:	January 29, 2001 (received)	Goose Creek – address secondary impacts through proposed Three County WRF and eliminate from this EA	Goose Creek IBT removed from EA; IBT request reduced. All sections of EA updated.
North Carolina Wildlife Resources Commission	Letter dated:	March 26, 2001	Letter of concurrence	
North Carolina Department of Environment and Natural Resources: Division of Parks and Recreation	Letter dated:	March 30, 2001	Letter of concurrence	

¹ Contacted for the proposed Three-County Water Reclamation Facility project