NIAGARA FALLS

NIAGARA RIVER

PORT COLBORNE

LAKE ERIE

2.13

2.18

3.4

LEGEND

- STUDY AREA BOUNDARY
- METEROLOGIC STATION (INDUSTRIAL DRIVE)
- FLOW GAUGE
- WATER QUALITY AND BIOMAP SITE

FORT ERIE CREEKS WATERSHED PLAN NIAGARA PENINSULA CONSERVATION AUTHORITY	STUDY AREA	PHILIPS ENGINEERING	Scale: NTS Consultant File No.: 105116 Figure No.: WS-1

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NIAGARA RIVER #16

NIAGARA RIVER #21

NIAGARA RIVER #22

NIAGARA RIVER #19

NIAGARA RIVER #20

LEGEND

OD-2 REACH NUMBER

SPLIT DRAINAGE :

MINOR SYSTEM TO KRAFT DRAIN
MAJOR SYSTEM TO BERTIE BAY DRAIN

POINT ABINO

THUNDER BAY

LAKE ERIE 1

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FORT ERIE CREEKS WATERSHED PLAN NIAGARA PENINSULA CONSERVATION AUTHORITY	STREAM MORPHOLOGY REACHES	PHILLIPS ENGINEERING	Scale: NTS Consultant File No.: 105116 Figure No.: WS-2

NIAGARA RIVER #16

NIAGARA RIVER #21

NIAGARA RIVER #22

NIAGARA RIVER #19

NIAGARA RIVER #20

Legend

Surveyed Culverts/Bridges Location

49 Surveyed Culverts/Bridges Number

POINT ABINO

THUNDER BAY

LAKE ERIE 1

SPLIT DRAINAGE :

MINOR SYSTEM TO KRAFT DRAIN
MAJOR SYSTEM TO BERTIE BAY DRAIN

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FORT ERIE CREEKS WATERSHED PLAN NIAGARA PENINSULA CONSERVATION AUTHORITY	SURVEYED CULVERTS/BRIDGES LOCATION PLAN	PHILLIPS ENGINEERING	Scale: NTS Consultant File No.: 105116 Figure No.: WS-3

* NOTE:
FRENCHMAN'S CREEK FLOODLINE AS MODELED BY THE NPCA IN 2004.

BAKER CREEK

ST. JOHN'S DRAIN

MARSH DRAIN

BLACK CREEK

BEAVER CREEK

MILLER CREEK

*FRENCHMAN'S CREEK

SIX MILE CREEK

KRAFT DRAIN

MANN DRAIN

BERTIE BAY DRAINS

LAKE ERIE

LEGEND:

- 100 YEAR REGULATORY FLOODLINE
- WATERSHED BOUNDARY
- SUBWATERSHED BOUNDARY
- WATERCOURSE/CREEK
- BLACK & BEAVER CREEK (LAYOUT SHEETS)
- BAKER CREEK (LAYOUT SHEETS)
- KRAFT CREEK (LAYOUT SHEETS)
- MILLER CREEK (LAYOUT SHEETS)
- SIX MILE CREEK (LAYOUT SHEETS)

No.	DATE	BY	REVISIONS	MAN	CAD

NIAGARA PENINSULA CONSERVATION AUTHORITY

FORT ERIE CREEKS WATERSHED PLAN
NIAGARA PENINSULA CONSERVATION AUTHORITY

FLOOD PLAIN MAPPING

PHILIPS ENGINEERING

Scale	1:35000
Consultant File No.	105116
Figure No.	WS-4

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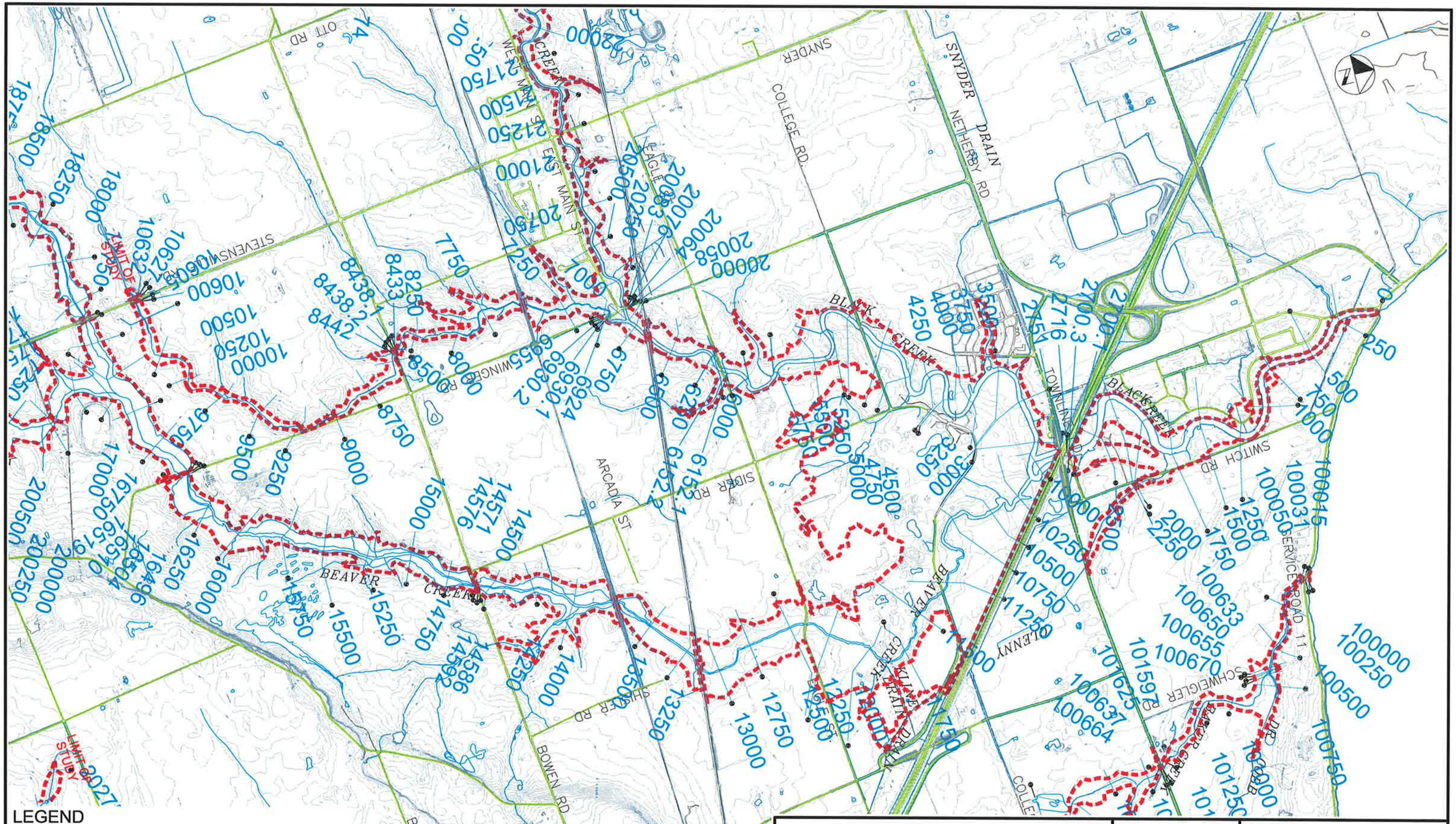

FORT ERIE CREEKS WATERSHED PLAN

NIAGARA PENINSULA CONSERVATION AUTHORITY

FLOODPLAIN MAPPING (SAMPLE)

PHILIPS ENGINEERING

Project No.	105116
Date	MARCH 2008
Scale	NTS
Figure No.	WS-5

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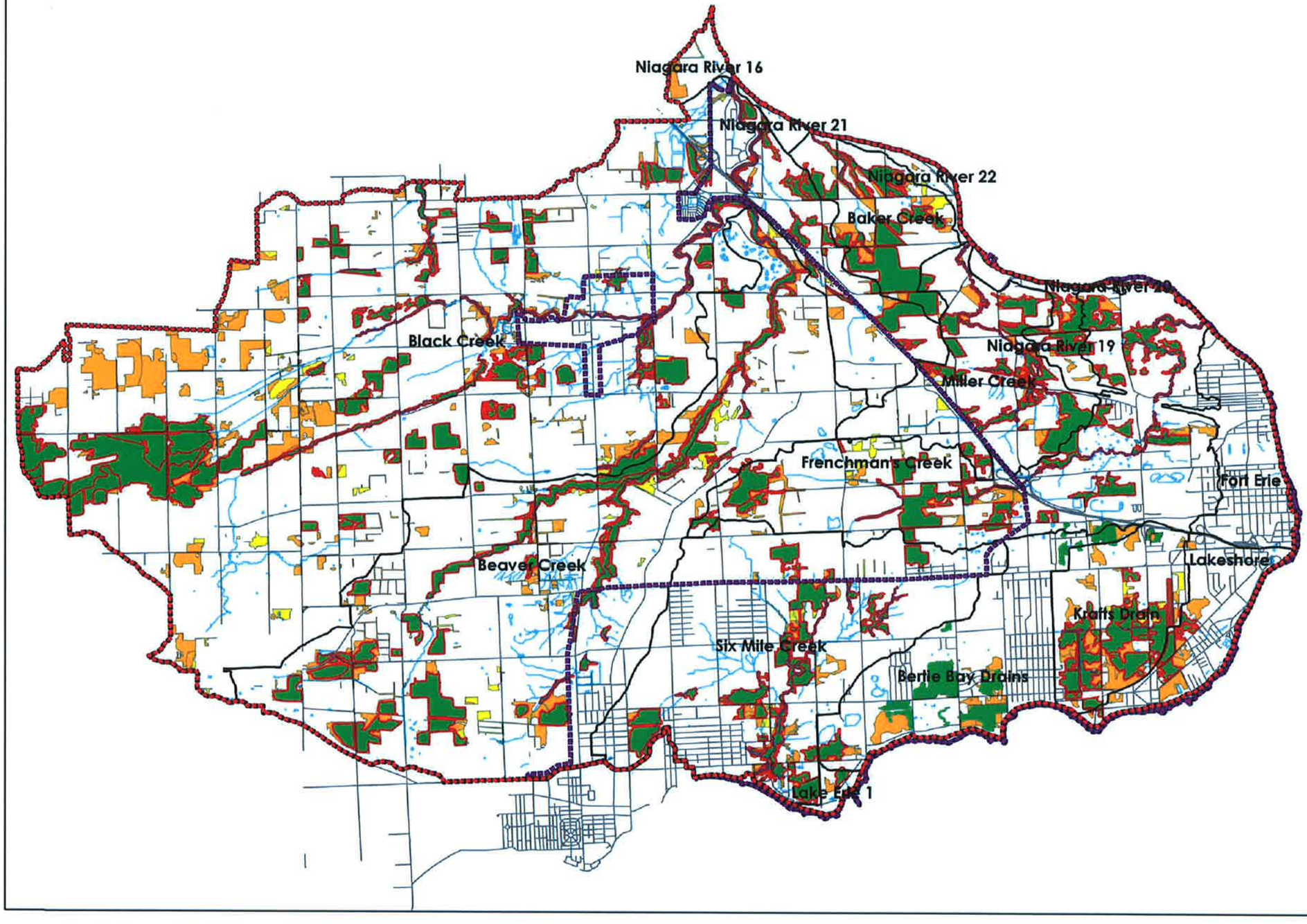

LEGEND

MNR Evaluated Wetlands (June, 2005)

- Provincially Significant Wetland
- MNR Evaluated Wetland

Other Forested Areas on Wet Soils:

- 100% poorly drained soil
- 50% - 70% poorly drained soil

- Study Area
- Settlement Area
- Subwatersheds
- Roads
- Streams

MNR is Ontario Ministry of Natural Resources
Wet soils are poorly or very poorly drained (from The Soils of The Regional Municipality of Niagara, by Kingston and Presant, 1989)

Fort Erie Subwatershed Study

Wetlands

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PROJECT: DA05-17A - Fort Erie Subwatershed Study

CLIENT: Niagara Region

N W E S

DATE: MARCH 2006

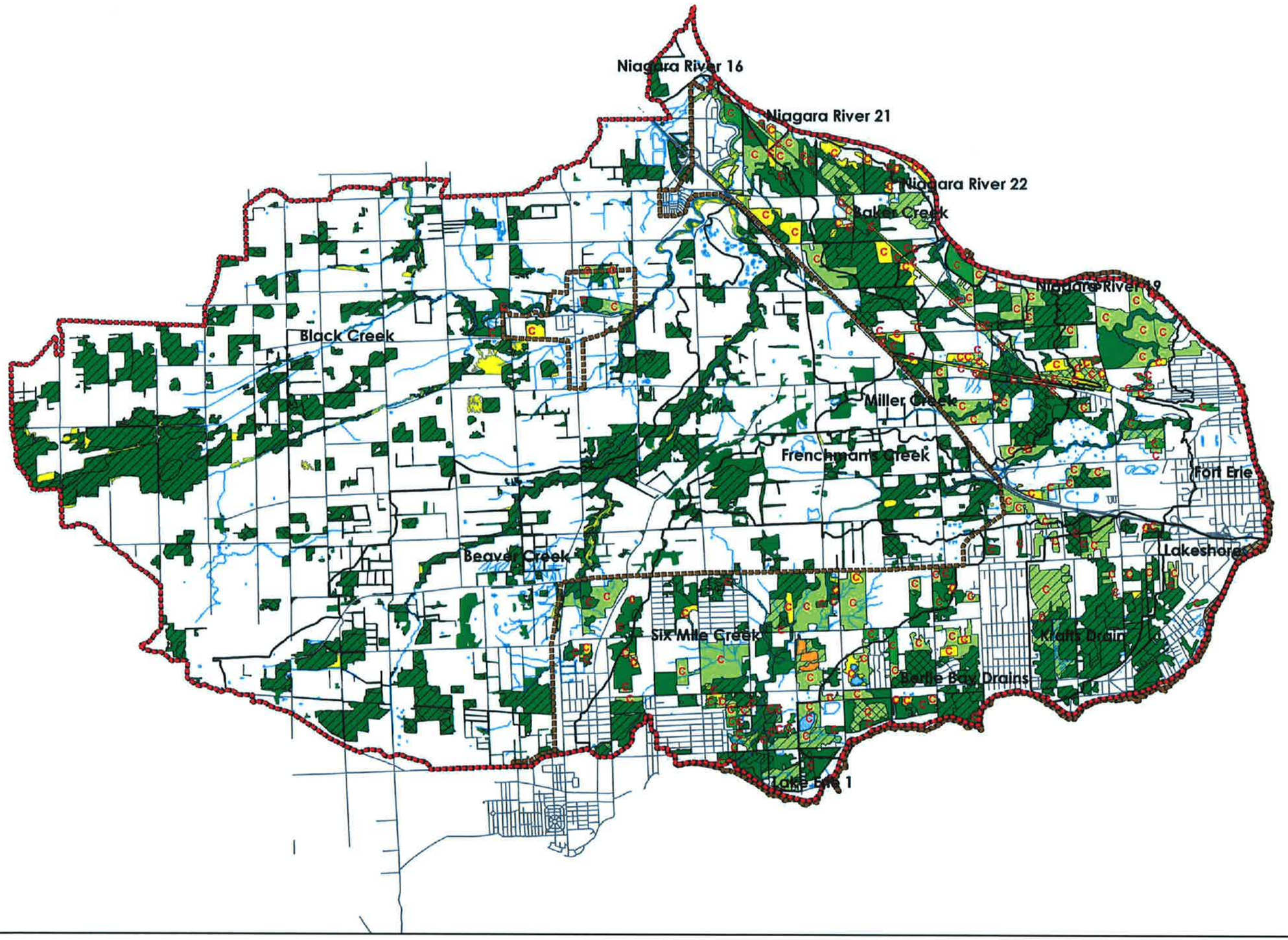
SCALE: 1:65000

DRAWN BY: MJT

CHECKED BY: ES

FIGURE NUMBER:

NH 1



LEGEND

Ecological Land Classification System

- Terrestrial
- Aquatic
- Wetland
- Terrestrial and Wetland Complex

Dominant Cover Type

- Open Aquatic
- Open: Beach Bar or Sand Dune
- Open: Prairie
- Open: Meadow or Marsh
- Shrubs*
- Sparse Treed
- Treed
- C Cultural History

- Study Area
- Settlement Area
- Subwatersheds
- Streams
- Roads

* mapped for Settlement Area only

Settlement Area data from Natural Areas Inventory :Town of Fort Erie Settlement Areas (Dougan & Associates, 2003)
Rural data from: SOLRIS (MNR, 2002) and Wetland Evaluations (MNR, June 2005)

Fort Erie Subwatershed Study

Dominant Cover Type

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PROJECT: DA05-17A - Fort Erie Subwatershed Study

CLIENT: Niagara Region

N W E S

DATE: MARCH 2006

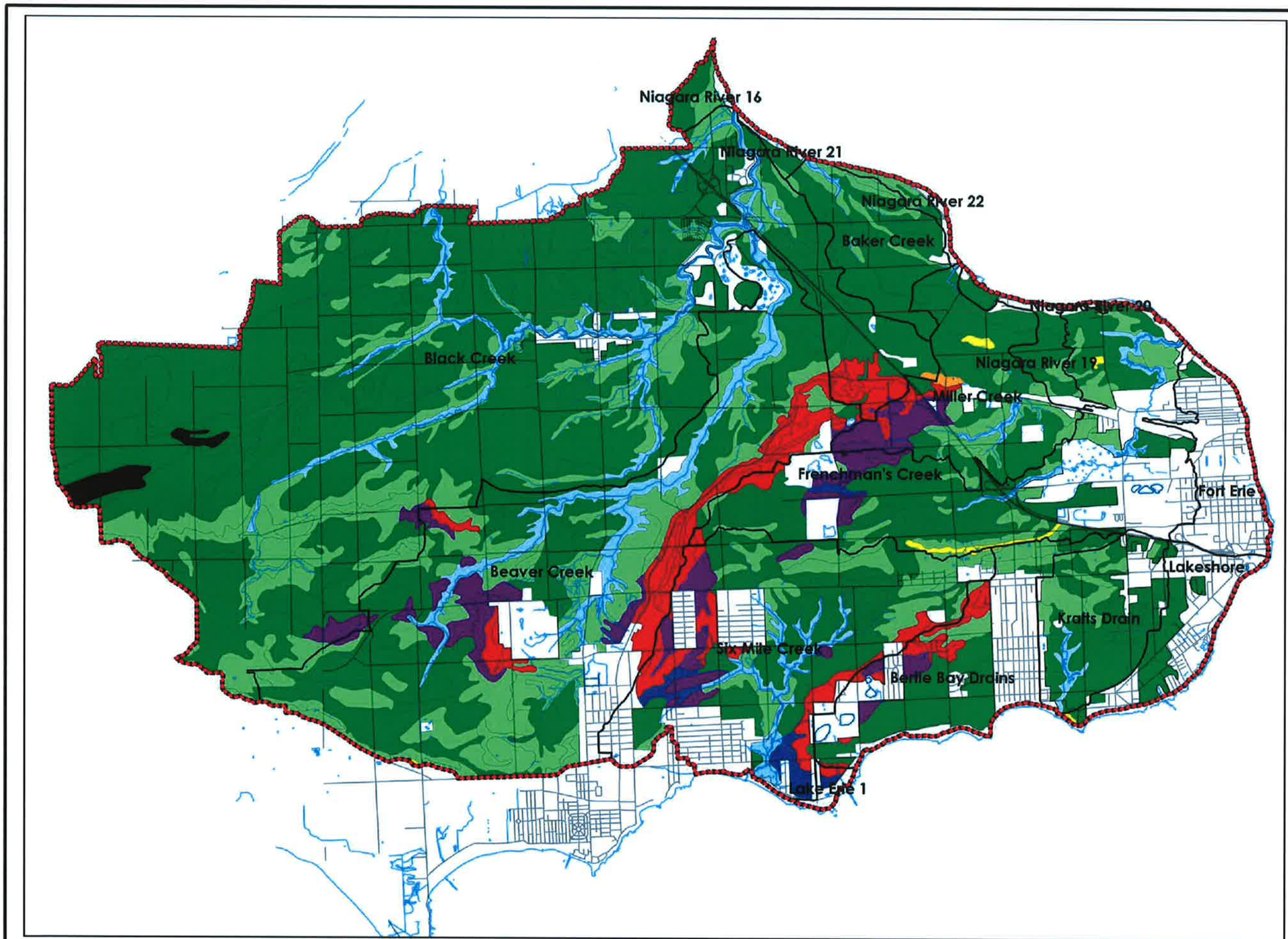
SCALE: 1:65000

DRAWN BY: MJT

CHECKED BY: ES

FIGURE NUMBER:

NH 2



LEGEND

Landscape

- Fine Soil Mesic Landscape
- Fine Soil Lowland
- Coarse Soil Upland
- Coarse Soil Mesic Landscape
- Shallow on Bedrock Upland
- Shallow on Bedrock Mesic Landscape
- Shallow on Bedrock Lowland
- Organic Wetland
- Occasionally Inundated
- Not Classified

- Study Area
- Subwatersheds
- Roads
- Streams

Soil data from The Soils of the Regional Municipality of Niagara - Sheet 7, Scale 1:25,000 (Kingston and Presant, 1989)

Fort Erie Subwatershed Study

Original Landscapes

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PROJECT: DA05-17A - Fort Erie Subwatershed Study

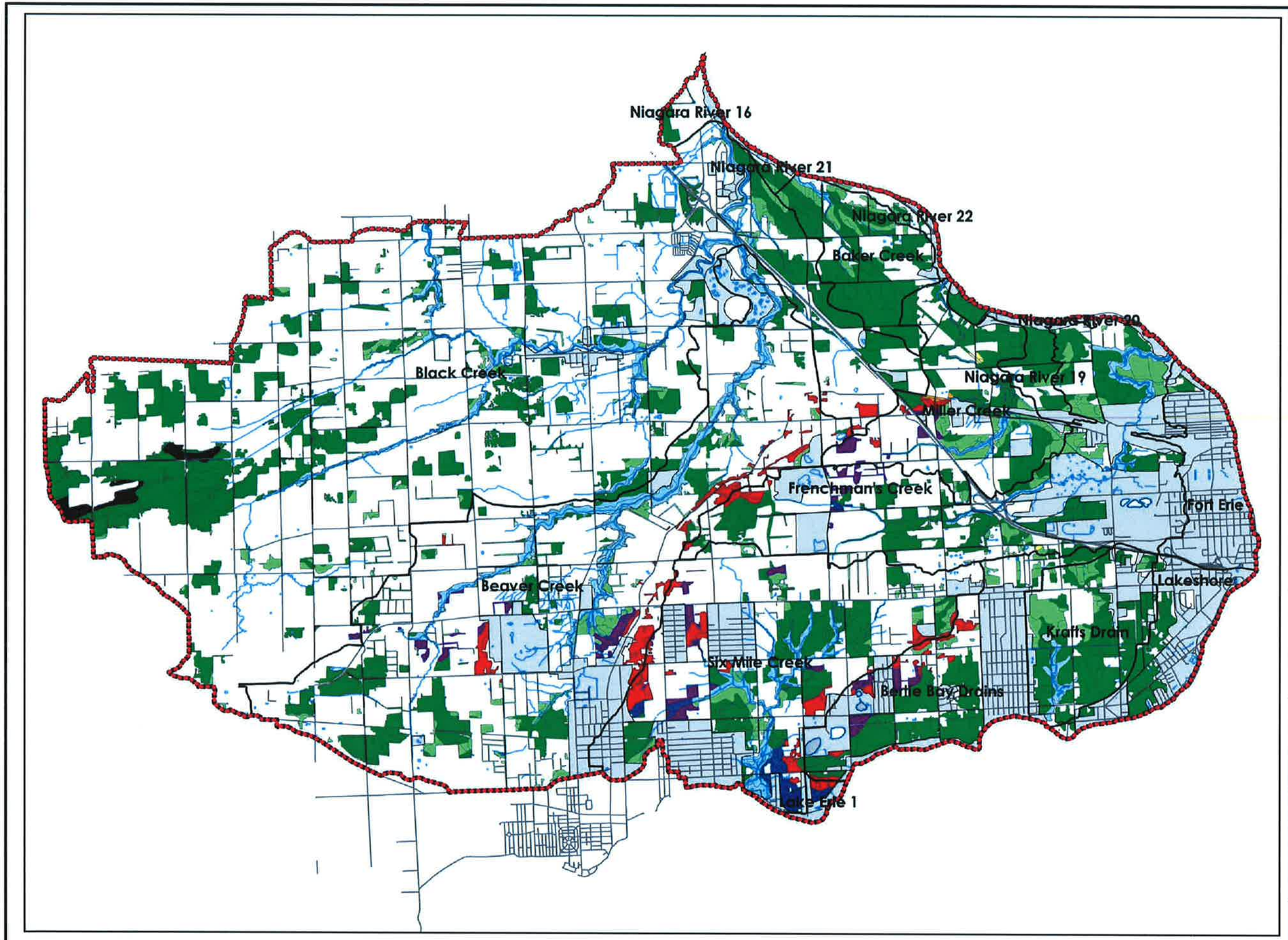
CLIENT: Niagara Region

N W E S

DATE: MARCH 2006
SCALE: 1:63000
DRAWN BY: MJT
CHECKED BY: ES

FIGURE NUMBER:

NH 3a



LEGEND

Landscape

- Fine Soil Mesic Landscape
- Fine Soil Lowland
- Coarse Soil Upland
- Coarse Soil Mesic Landscape
- Shallow on Bedrock Upland
- Shallow on Bedrock Mesic Landscape
- Shallow on Bedrock Lowland
- Organic Wetland
- Occasionally Inundated
- Not Mapped

- Study Area
- Subwatersheds
- Streams
- Roads
- Urban

Soil data from The Soils of the Regional Municipality of Niagara - Sheet 7, Scale 1:25,000 (Kingston and Presant, 1989)

Fort Erie Subwatershed Study

Current Natural Landscapes

DOUGAN & ASSOCIATES
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PROJECT: DA05-17A - Fort Erie Subwatershed Study

CLIENT: Niagara Region

DATE: MARCH 2006

SCALE: 1:65000

DRAWN BY: MJT

CHECKED BY: ES

FIGURE NUMBER:

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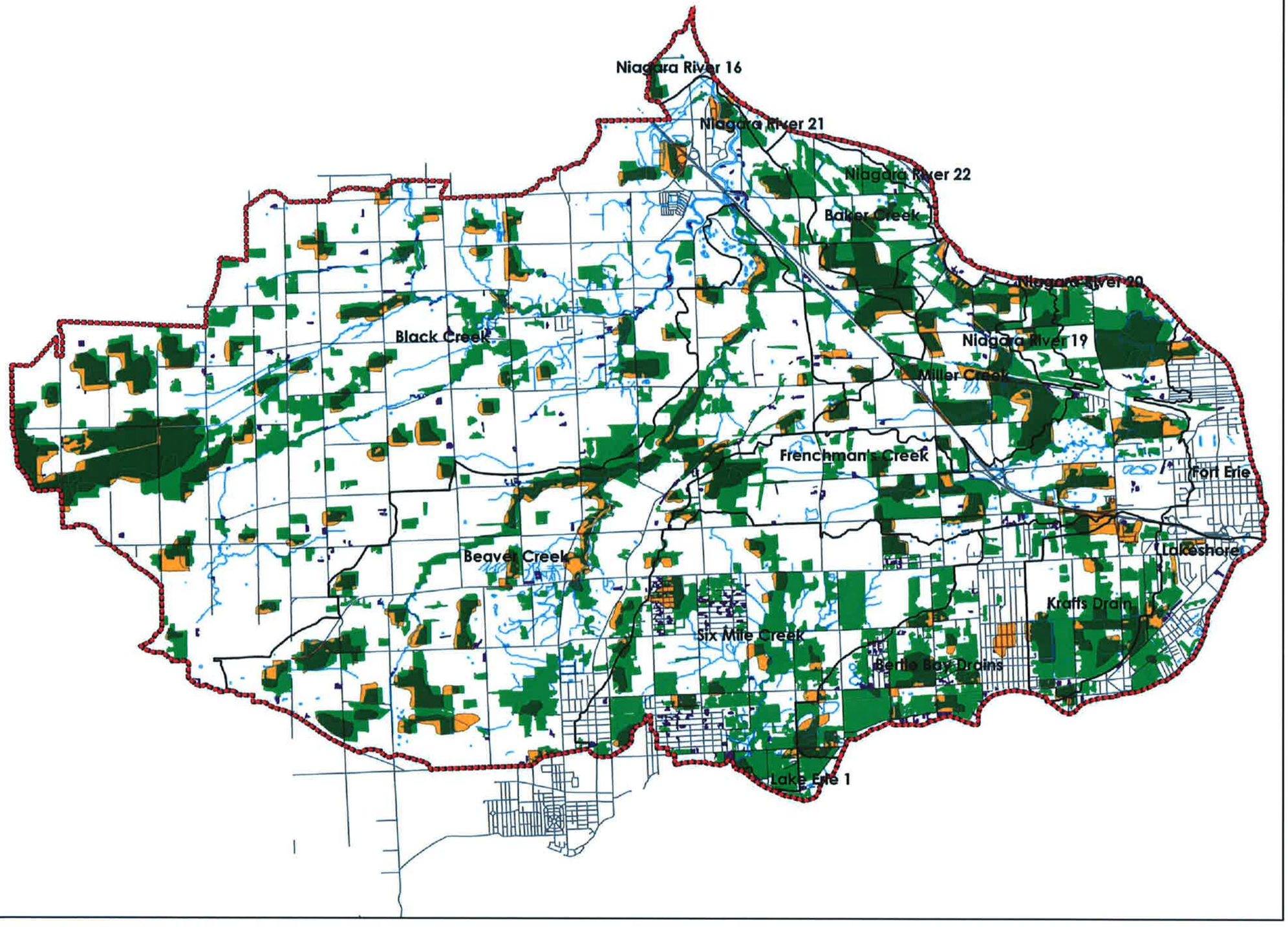

LEGEND

Forest Cover

- Mature Forest Areas (Present in 1967 and 2000)
- Recent Forest Loss: 1967-2000
- Recent Forest Gain: 1967-2000
- Small Forested Areas present in 2000 but beyond resolution of 1967 data

- Study Area
- Subwatersheds
- Streams
- Roads

Note: Small shifts in 1967 forest coverage may generate some false changes.
1967 data from Canada Land Inventory (1:50,000)
2000 data from NPCA

Fort Erie Subwatershed Study

Recent Forest Change

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CLIENT: Niagara Region

N W E S

DATE: MARCH 2006

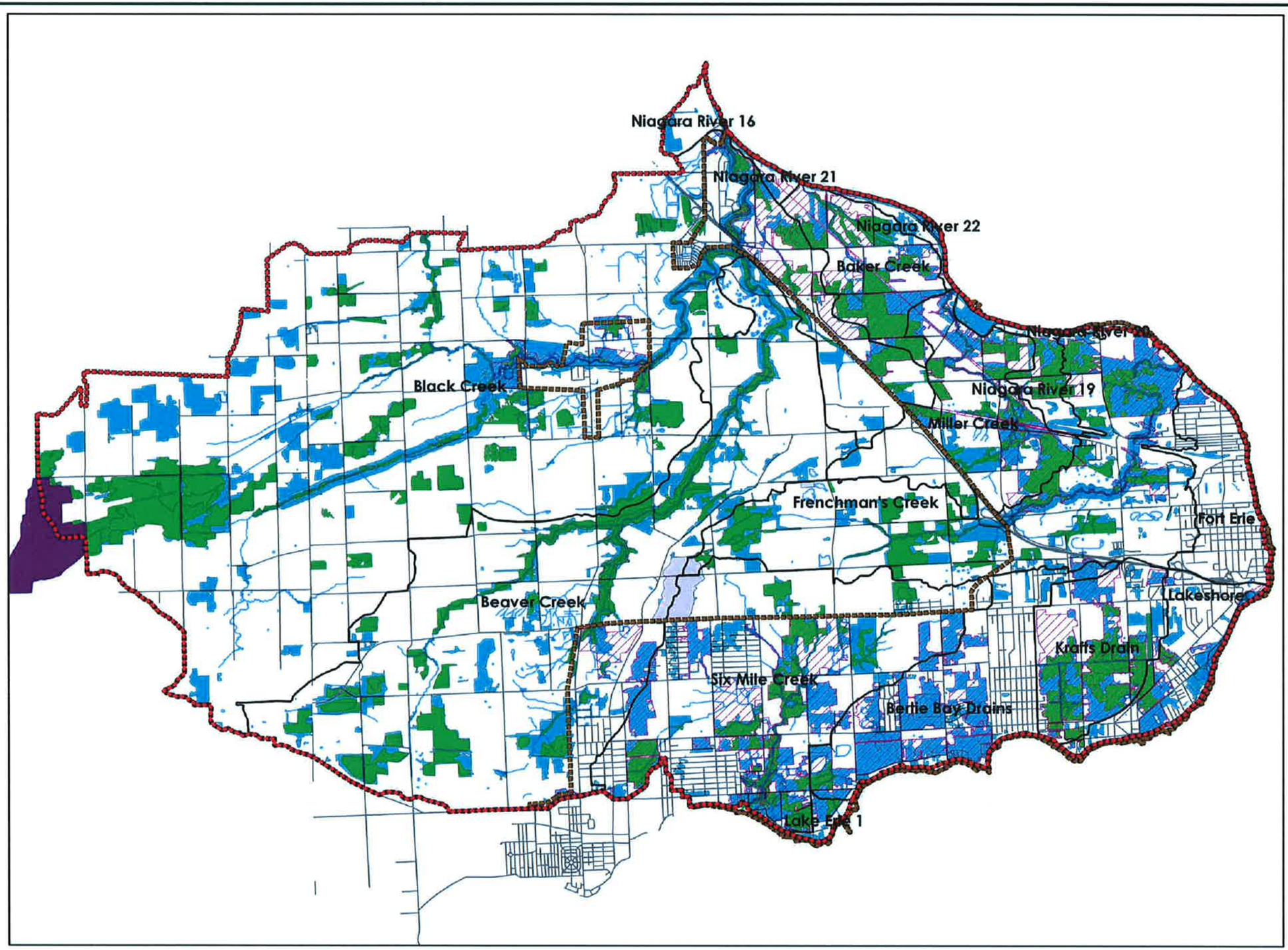
SCALE: 1:65000

DRAWN BY: MJT

CHECKED BY: ES

FIGURE NUMBER:

NH 4



Legend

Provincially Significant

- Environmental Protection Area

Regionally Significant

- Environmental Conservation Area

Other Policy Area

- Earth Science ANSI
- Life Science ANSI
- Locally Significant Natural Area (Settlement Area Only)

- Study Area
- Settlement Area
- Subwatersheds
- Roads
- Streams

Locally significant natural area from Natural Areas Inventory :Town of Fort Erie Settlement Areas (Dougan & Associates, 2003)
Other data from Core Natural Heritage Map (Regional Municipality of Niagara, December, 2005)

Fort Erie Subwatershed Study

Natural Areas Significance

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CLIENT: Niagara Region

N W E S

DATE: MARCH 2006

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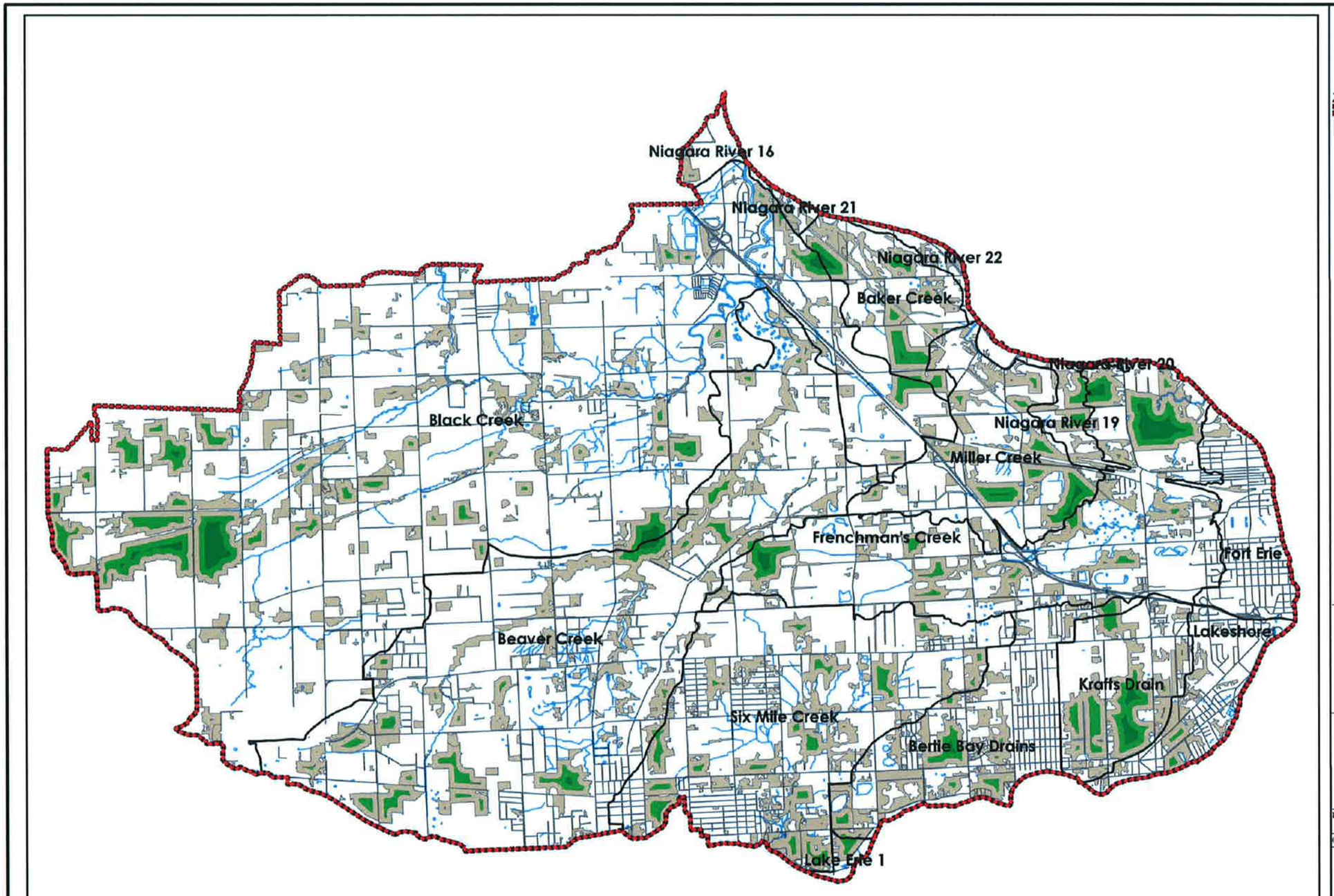
FIGURE NUMBER:

NH 5



LEGEND

- > 200m from Forest Edge
- 100 to 200m from Forest Edge
- <100m from Forest Edge
- Study Area
- Subwatersheds
- Roads
- Streams

Forest boundaries from SOLRIS (MNR, 2002)

Fort Erie Subwatershed Study

Interior Forest

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PROJECT: DA05-17A - Fort Erie Subwatershed Study

CLIENT: Niagara Region

N W E S

DATE: MARCH 2006

SCALE: 1:63000

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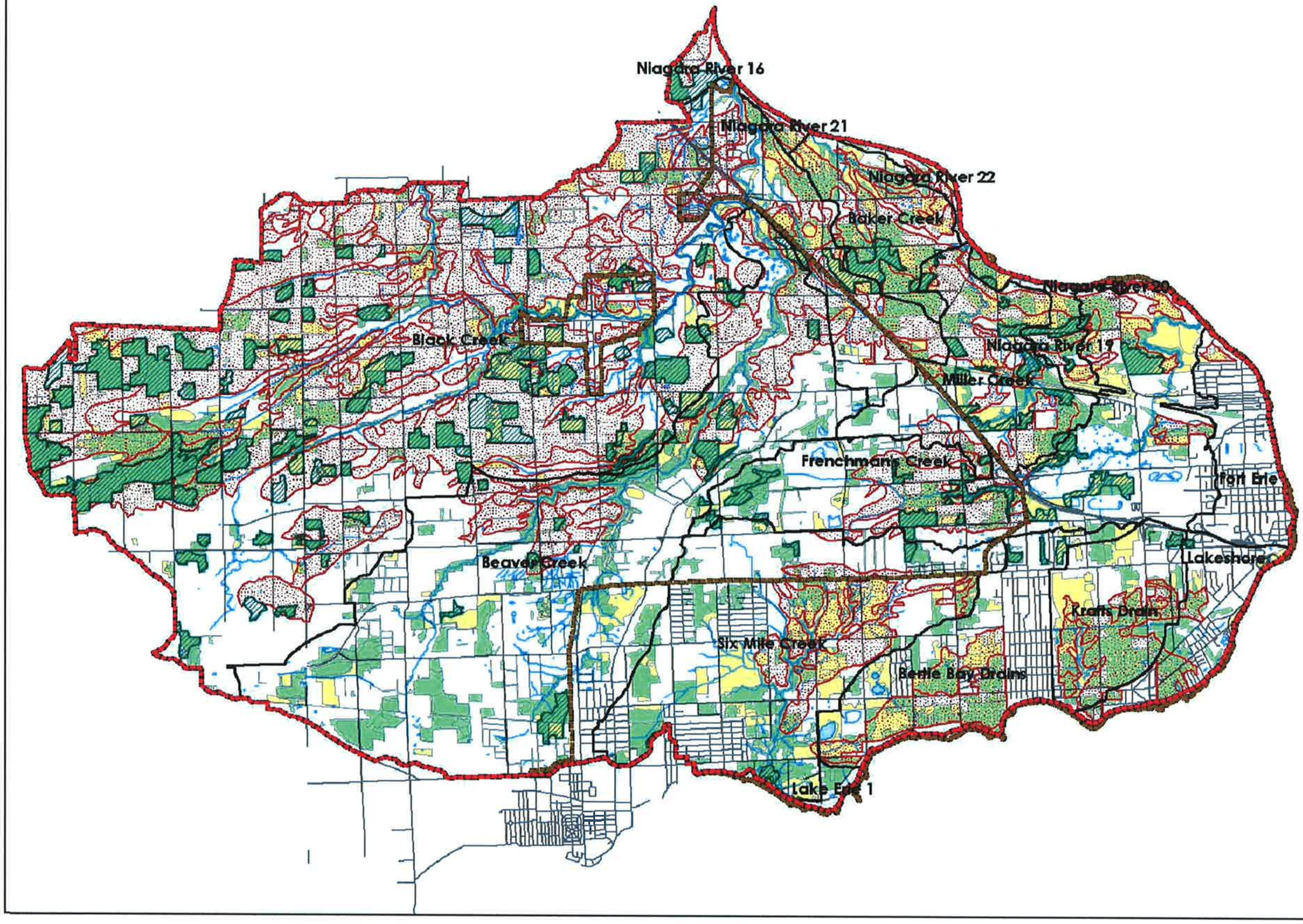
CHECKED BY: ES

FIGURE NUMBER:

NH 6



LEGEND

- Remaining Swale Landscape (approx.)
- Levelled Swale Landscape (estimated)

Natural Cover

- Treed Cover
- Non-treed Cover

- Study Area
- Settlement Area
- Subwatersheds
- Streams and Waterbodies
- Roads

Sources:

Settlement Area cover data from Natural Areas Inventory :Town of Fort Erie Settlement Areas (Dougan & Associates, 2003) Rural cover data from: SOLRIS (MNR, 2002) and air photography (2002).

Swale landscape interpreted from air photos (Niagara Region, 2002). Levelled swales estimate interpreted from wet lacustrine soils of The Soils of the Regional Municipality of Niagara (Kingston and Presant, 1989).

Fort Erie Creeks Watershed Study

Estimate of Swale Landscapes: Remaining and Levelled

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PROJECT: DAIS-17A - Fort Erie Subwatershed Study

CLIENT: Niagara Region

N W E S

DATE: SEPTEMBER 2006

SCALE: 1:65000

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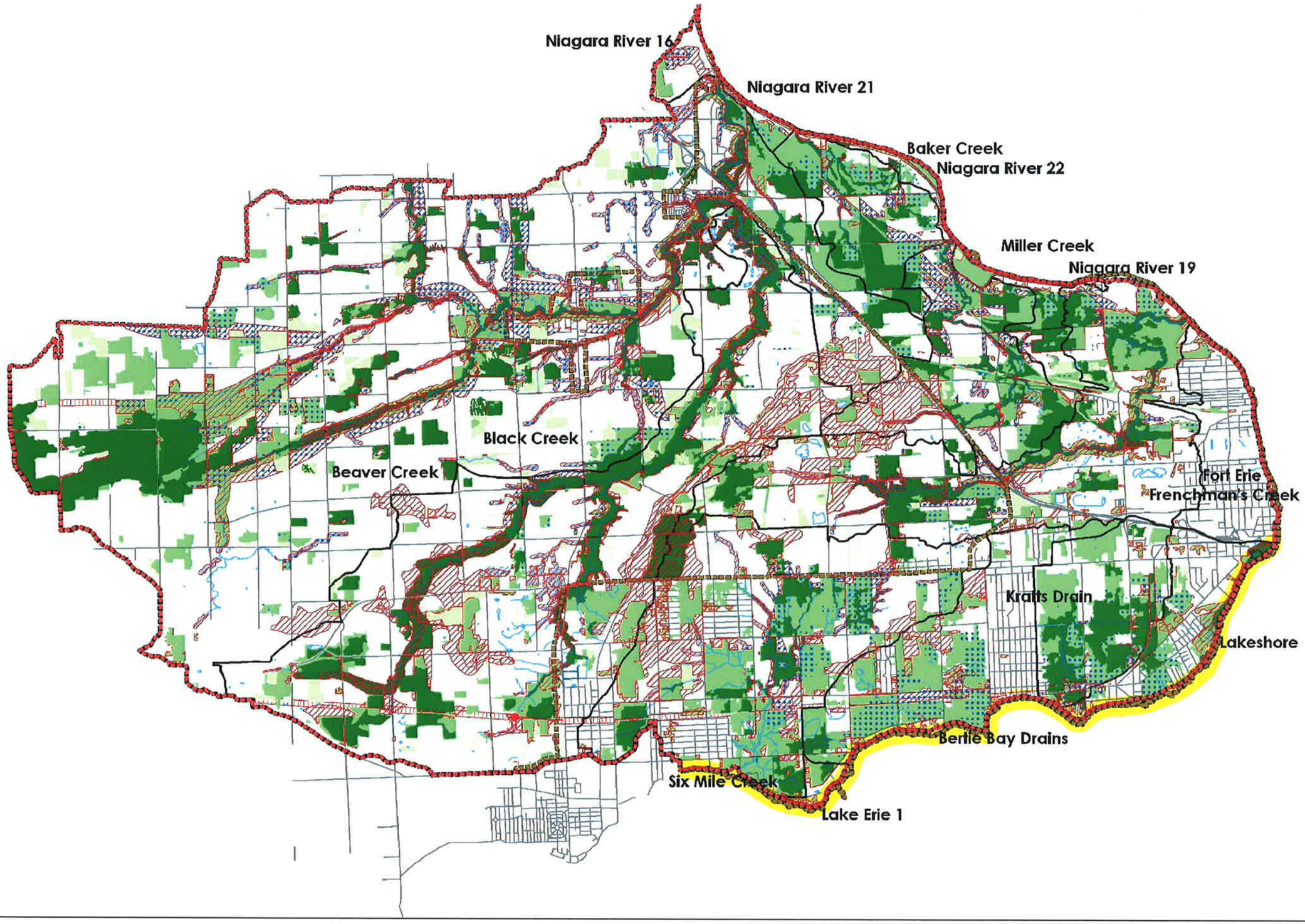
CHECKED BY: ES

FIGURE NUMBER:

NH 7



LEGEND

Protection

- Full Protection (High significance)
- Conservation (Medium significance)
- Other Natural Cover (Lower significance)
- Restoration Options
- Lake Erie Shoreline Zone of Opportunity
- Swale Restoration Options

- Study Area
- Settlement Area
- Subwatersheds
- Streams and Waterbodies
- Roads

Sources
Niagara Region's Core Natural Heritage Map (2005)
Fort Erie Draft Official Plan (2006)
Port Colborne Draft Official Plan (2005)
Natural Areas Inventory Fort Erie
Settlement Area (Dougan & Associates, 2003)
Soils of the Regional Municipality of Niagara (Kingston and Presant. 1989)
Forest Extent (MNR, 2002)
Air photography (2002)

Fort Erie Creeks Watershed Plan

Proposed Natural Heritage Strategy

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PROJECT: DA05-17A - Fort Erie Subwatershed Study

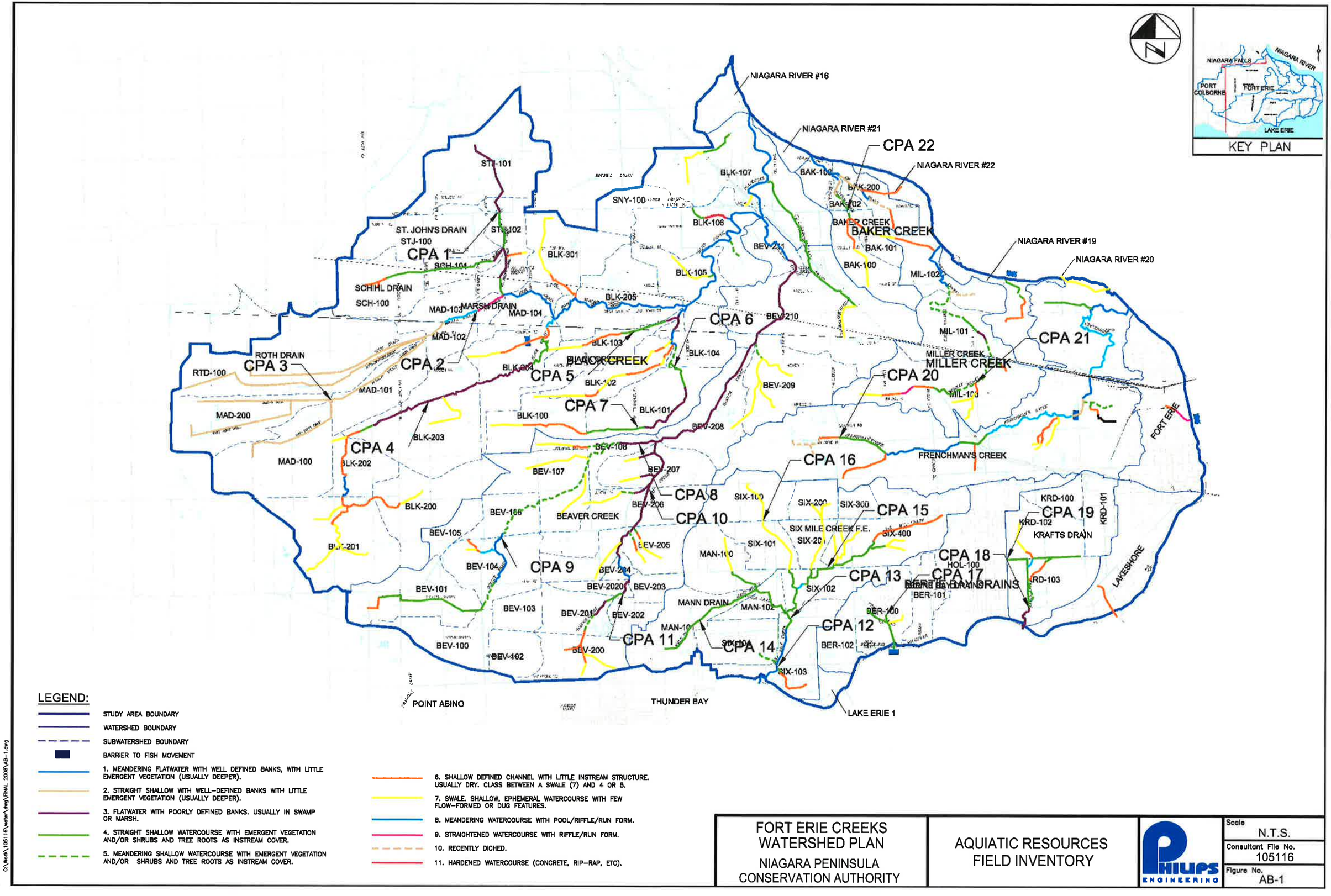
CLIENT: Niagara Region

N W E S

DATE: OCTOBER 2006
REVISED: DECEMBER 2006
SCALE: 1:65000
DRAWN BY: KSL
CHECKED BY: BS

FIGURE NUMBER

NH 8



LEGEND:

- STUDY AREA BOUNDARY
- WATERSHED BOUNDARY
- SUBWATERSHED BOUNDARY
- BARRIER TO FISH MOVEMENT
- 1. MEANDERING FLATWATER WITH WELL DEFINED BANKS, WITH LITTLE EMERGENT VEGETATION (USUALLY DEEPER).
- 2. STRAIGHT SHALLOW WITH WELL-DEFINED BANKS WITH LITTLE EMERGENT VEGETATION (USUALLY DEEPER).
- 3. FLATWATER WITH POORLY DEFINED BANKS. USUALLY IN SWAMP OR MARSH.
- 4. STRAIGHT SHALLOW WATERCOURSE WITH EMERGENT VEGETATION AND/OR SHRUBS AND TREE ROOTS AS INSTREAM COVER.
- 5. MEANDERING SHALLOW WATERCOURSE WITH EMERGENT VEGETATION AND/OR SHRUBS AND TREE ROOTS AS INSTREAM COVER.
- 6. SHALLOW DEFINED CHANNEL WITH LITTLE INSTREAM STRUCTURE. USUALLY DRY. CLASS BETWEEN A SWALE (7) AND 4 OR 5.
- 7. SWALE. SHALLOW, EPHEMERAL WATERCOURSE WITH FEW FLOW-FORMED OR DUG FEATURES.
- 8. MEANDERING WATERCOURSE WITH POOL/RIFFLE/RUN FORM.
- 9. STRAIGHTENED WATERCOURSE WITH RIFFLE/RUN FORM.
- 10. RECENTLY DICHED.
- 11. HARDENED WATERCOURSE (CONCRETE, RIP-RAP, ETC).

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FORT ERIE CREEKS WATERSHED PLAN

NIAGARA PENINSULA CONSERVATION AUTHORITY

AQUATIC RESOURCES FIELD INVENTORY

PHILIPS ENGINEERING

Scale	N.T.S.
Consultant File No.	105116
Figure No.	AB-1

MNR[1] Fish Sampling Sites

BL	Black Creek
BE	Beaver Creek
BA	Baker Creek
MI	Miller Creek
FR	Frenchman's Creek

ROM[2] Fish Sampling Sites

ROM	Throughout study area

Proposed Fish Sampling Sites

	2006

1 - Ministry of Natural Resources
2 - Royal Ontario Museum

Habitat Type
(Source: MNR)

- Critical (Type 1)
- Important (Type 2)
- Marginal (Type 3)
- Muskellunge spawning habitat
- Smallmouth bass spawning habitat

USA

Niagara River

US

Lake Erie

NIAGARA RIVER #16
NIAGARA RIVER #21
NIAGARA RIVER #22
NIAGARA RIVER #19
NIAGARA RIVER #20
BAKER CREEK
BLACK CREEK
MILLER CREEK
BEAVER CREEK
SIX MILE CREEK
FRENCHMAN'S CREEK
KRAFTS DRAIN
BERTIE BAY DRAINS
FORT ERIE
LAKESHORE
LAKE ERIE 1

BL-1, BL-2, BL-3, BL-4
BA-1
BE-1, BE-2
ROM-1, ROM-2, ROM-3, ROM-4, ROM-5, ROM-6, ROM-7, ROM-8
MI-1, MI-2, MI-3
FR-1, FR-2, FR-3, FR-4, FR-5, FR-6, FR-7, FR-8, FR-9, FR-10

0 1 2 3 km

FORT ERIE CREEKS WATERSHED PLAN NIAGARA PENINSULA CONSERVATION AUTHORITY	STREAM TYPE	PHILIPS ENGINEERING	Scale: NTS Consultant File No.: 105116 Drawing No.: AB-2

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