CDM

City of North Royalton

Ohio Turnpike 3rd Lane Expansion Investigation Study

Followup Neighborhood Meeting

November 10, 2005

Agenda

- Study Objectives and Methodology
- Evaluation of Flooding Problems
- Relationship between Flooding and Turnpike Expansion
- Flood Control Alternatives
- Next Steps

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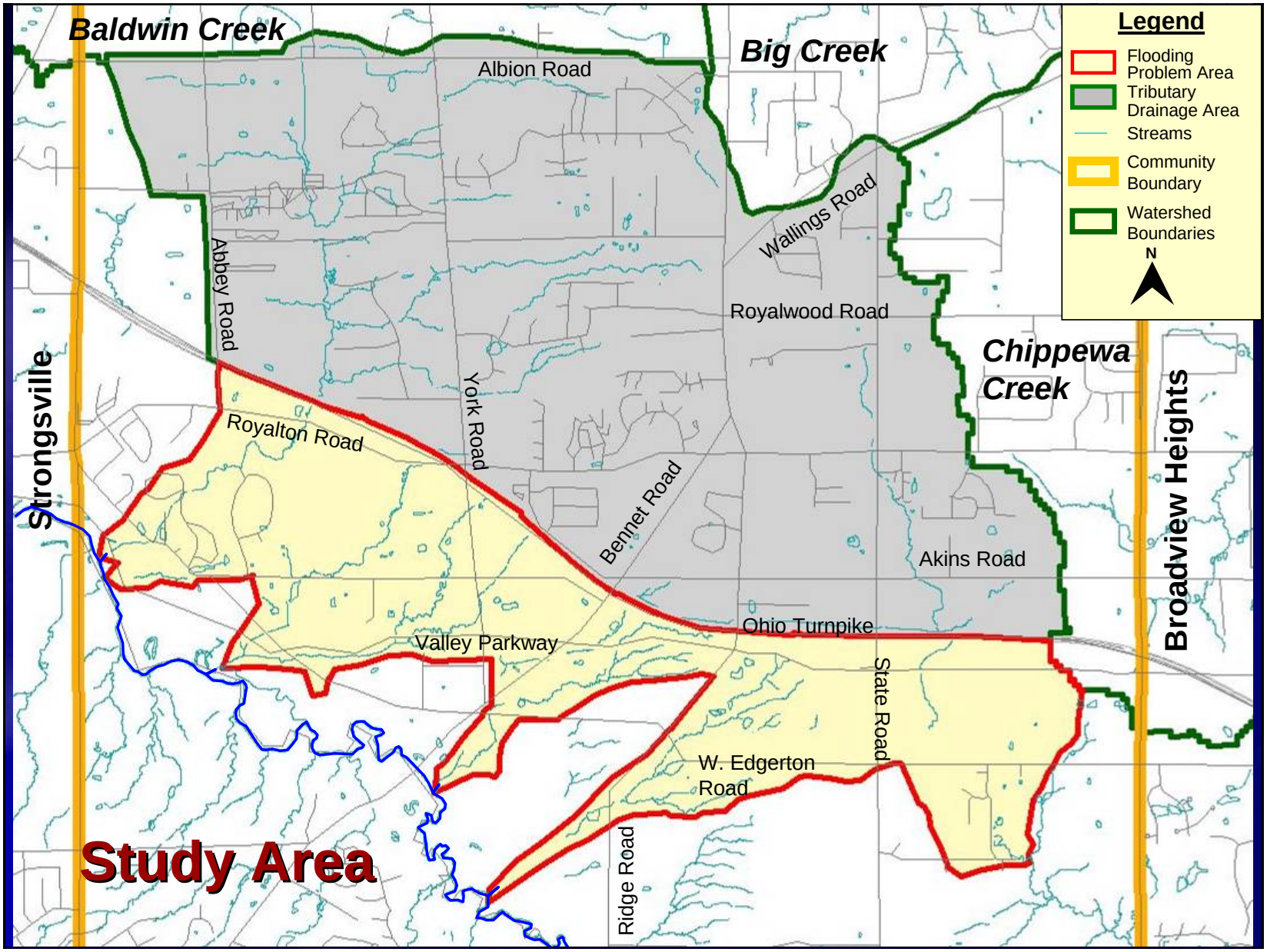

Baldwin Creek
Big Creek
Chippewa Creek
Strongsville
Broadview Heights
Albion Road
Abbey Road
York Road
Royalton Road
Bennet Road
Wallings Road
Royalwood Road
Akins Road
Ohio Turnpike
Valley Parkway
State Road
W. Edgerton Road
Ridge Road
Study Area
Legend
Flooding Problem Area
Tributary Drainage Area
Streams
Community Boundary
Watershed Boundaries
N

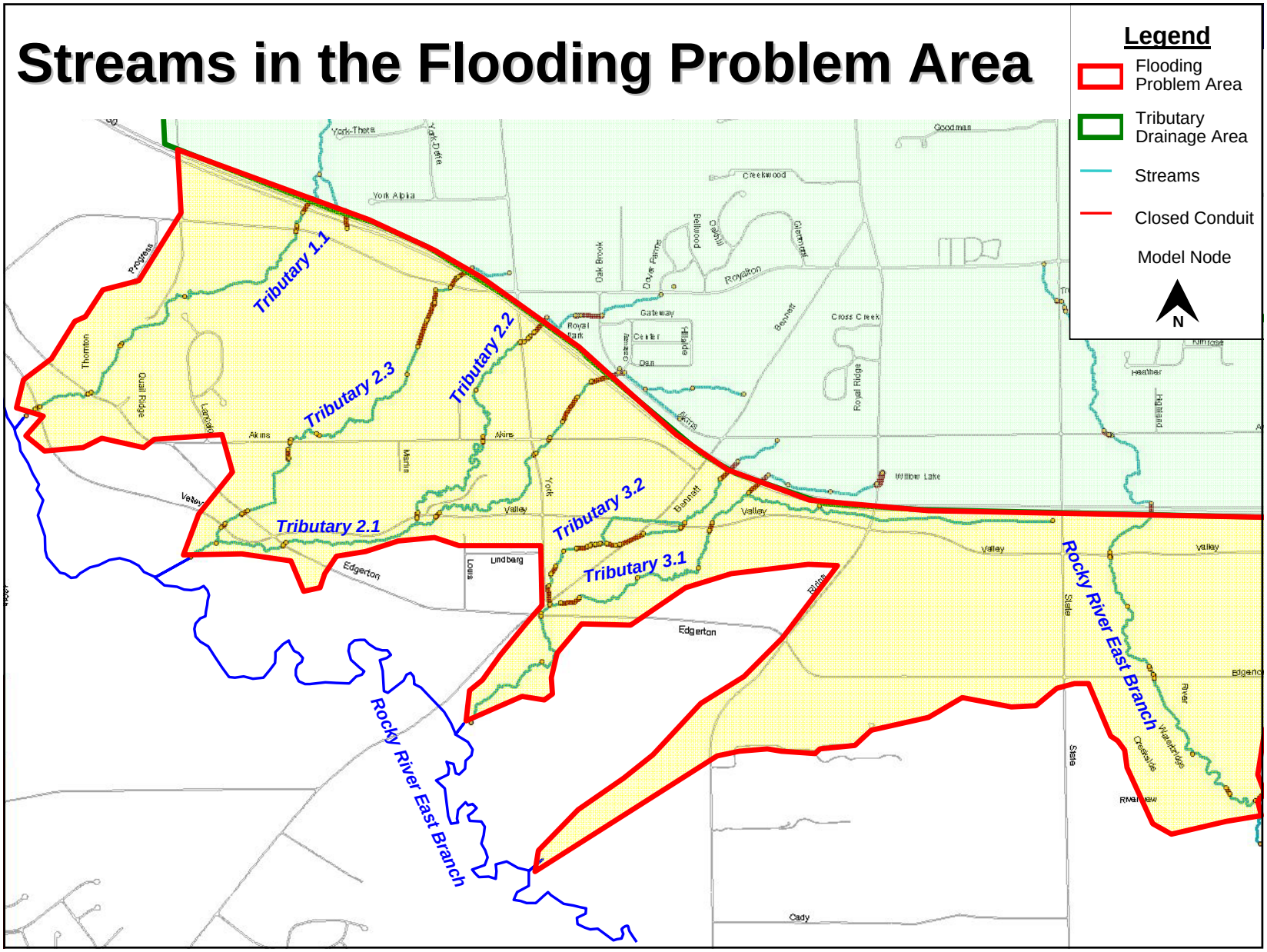
Study Objectives

- Determine if the expansion of the Turnpike has caused or contributed to increased property flooding
- Make recommendations on alternatives available to address resident flooding concerns in areas where Turnpike expansion has worsened flooding

Study Methodology

- Define Drainage System, Watershed and Problem Characteristics
  - Available Data Review
  - Neighborhood Meeting and Resident Interviews
  - Field Reconnaissance
- Drainage System Modeling
  - Historic Storms
  - Design Storms
  - Development Scenarios
- Alternative Development and Evaluation
- Reporting

Streams in the Flooding Problem Area



The natural drainage system has been modified in an attempt to address flooding and erosion issues

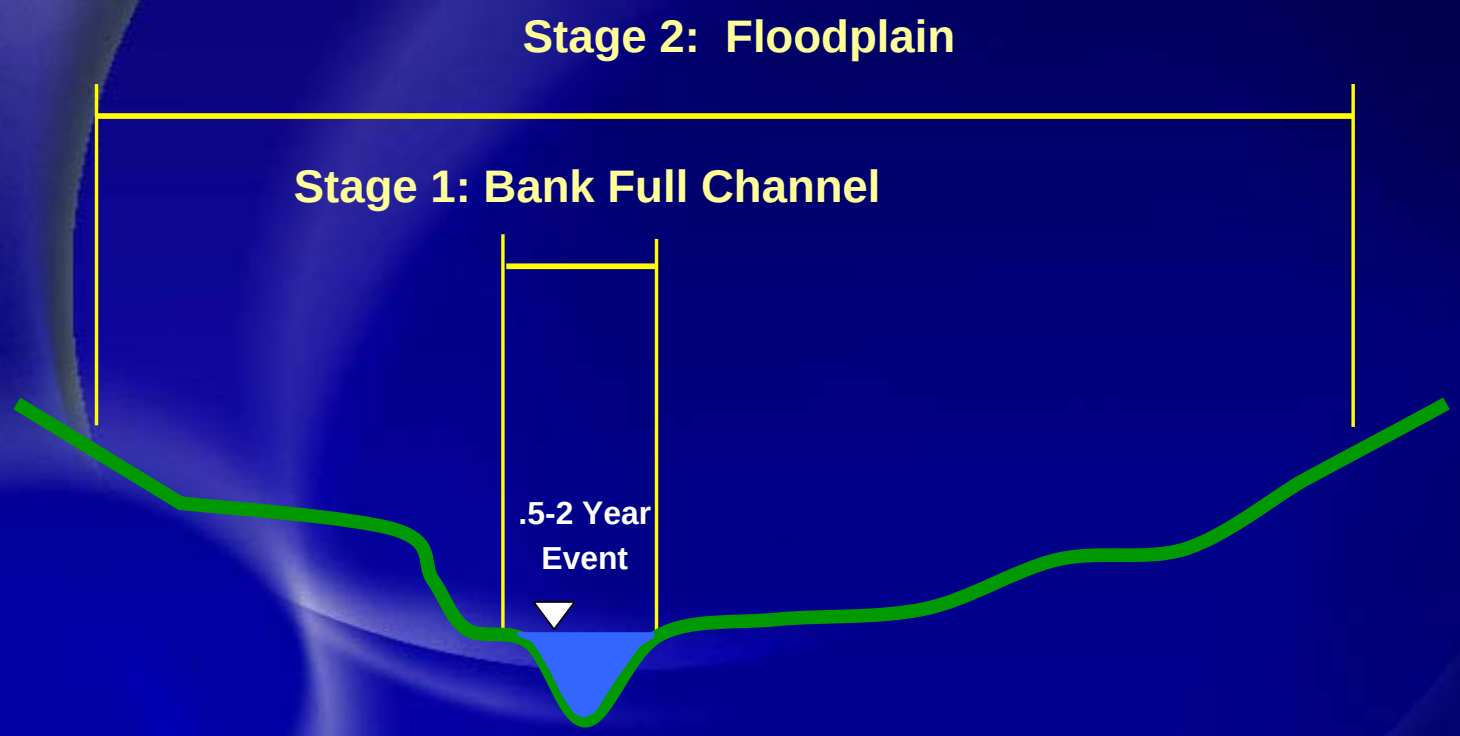
Storm Water: Myths and Facts

Myth

- Streams stay in their banks

Fact

- Channels develop two stages



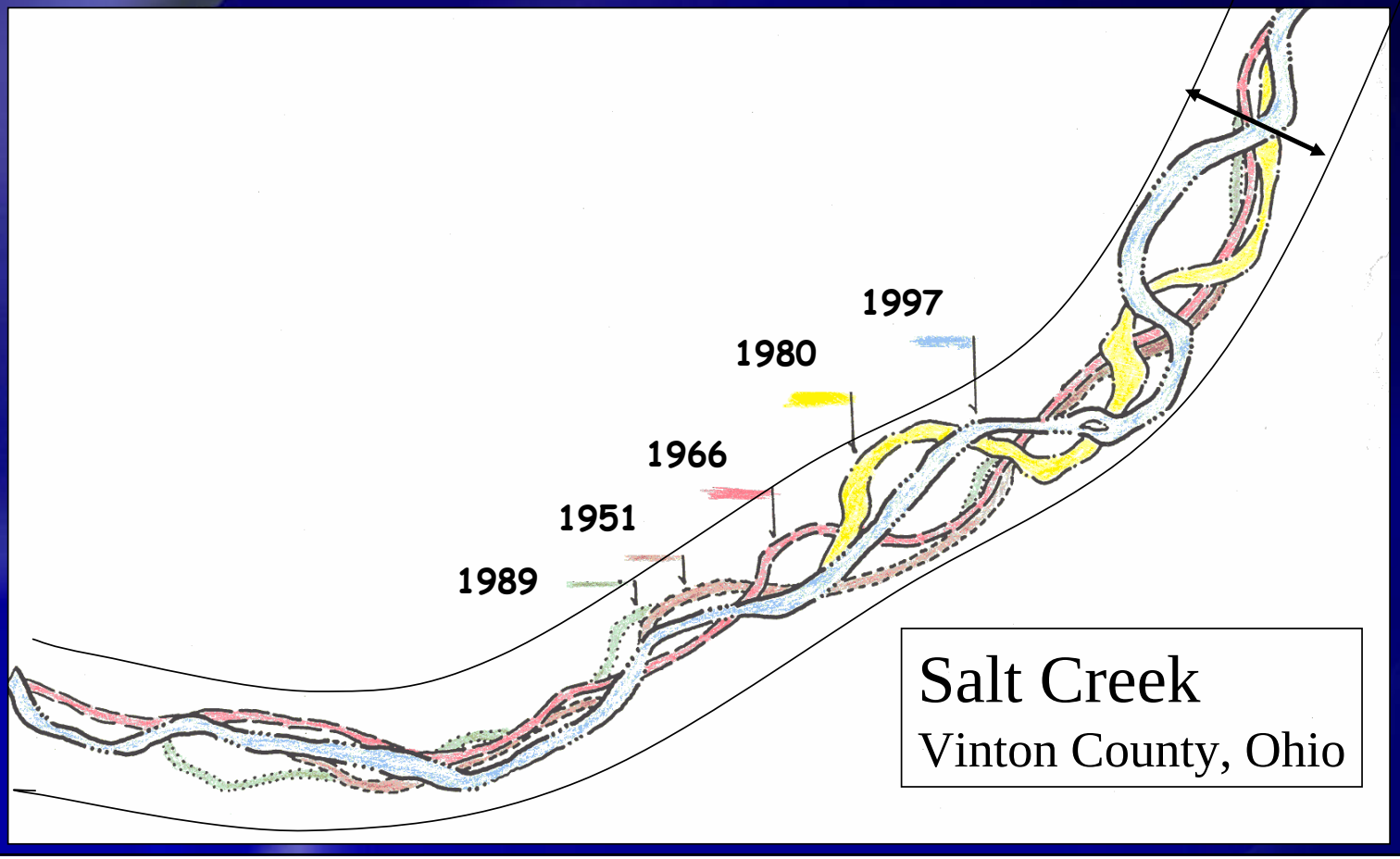
Storm Water: Myths and Facts

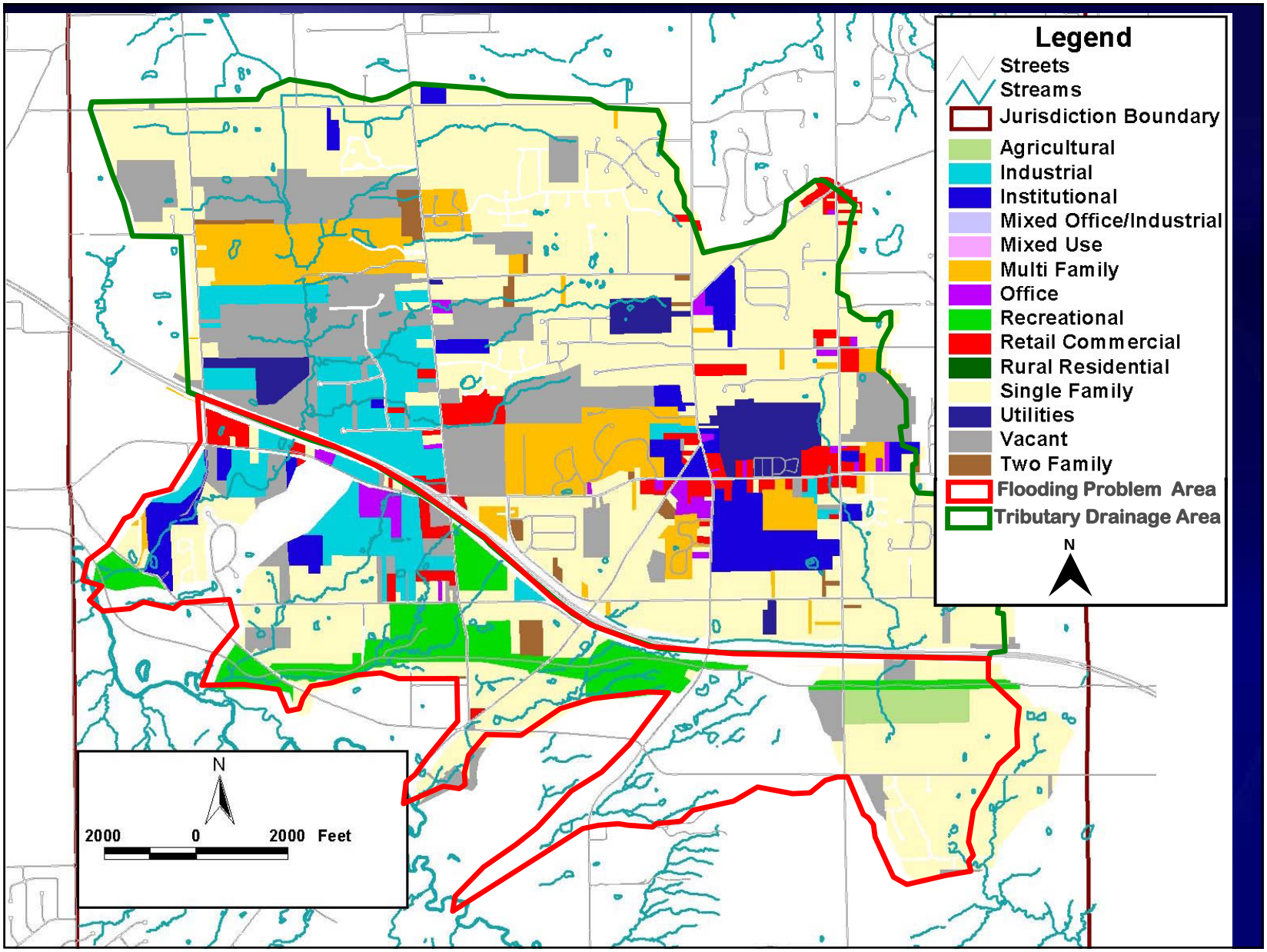
Myth

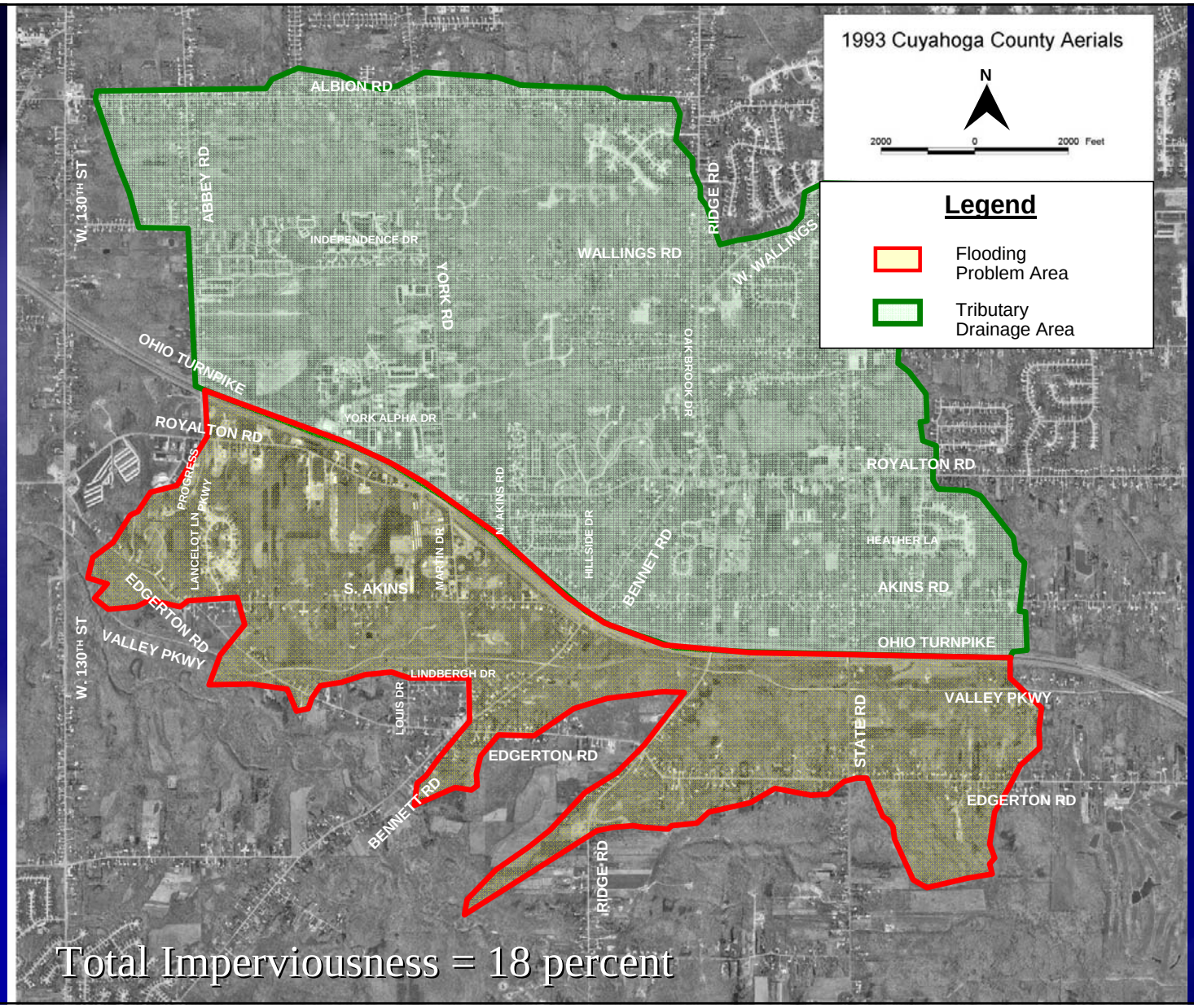
- Streams do not move

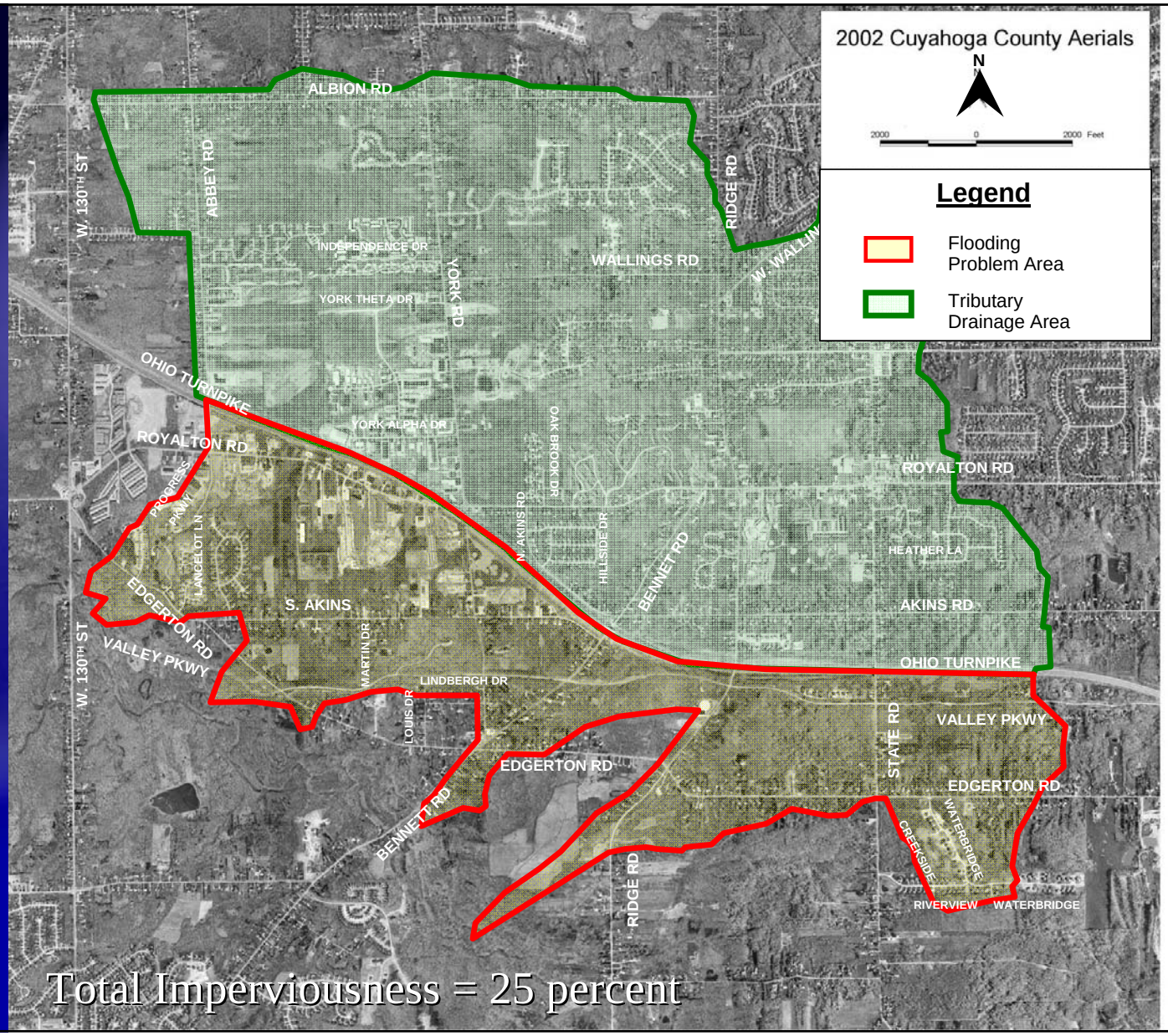
Fact

- Streams move continuously




Legend
Streets
Streams
Jurisdiction Boundary
Agricultural
Industrial
Institutional
Mixed Office/Industrial
Mixed Use
Multi Family
Office
Recreational
Retail Commercial
Rural Residential
Single Family
Utilities
Vacant
Two Family
Flooding Problem Area
Tributary Drainage Area
N
N
2000
0
2000
Feet


1993 Cuyahoga County Aerials
N
2000
0
2000 Feet
Legend
Flooding Problem Area
Tributary Drainage Area
ALBION RD
ABBEY RD
W. 130TH ST
INDEPENDENCE DR
YORK RD
WALLINGS RD
RIDGE RD
W. WALLINGS
OAK BROOK DR
OHIO TURNPIKE
ROYALTON RD
YORK ALPHA DR
PROGRESS
LANCELOT LN PKWY
N. AKINS RD
HILLSIDE DR
BENNETT RD
HEATHER LA
AKINS RD
S. AKINS
MARTIN DR
EDGERTON RD
VALLEY PKWY
LINDBERGH DR
LOUIS DR
STATE RD
Total Imperviousness = 18 percent


2002 Cuyahoga County Aerials
N
2000
0
2000 Feet
Legend
Flooding Problem Area
Tributary Drainage Area
ALBION RD
W. 130TH ST
ABBEY RD
INDEPENDENCE DR
YORK THETA DR
YORK RD
WALLINGS RD
RIDGE RD
OHIO TURNPIKE
ROYALTON RD
YORK ALPHA DR
OAK BROOK DR
N. AKINS RD
HILLSIDE DR
BENNETT RD
HEATHER LA
AKINS RD
PROGRESS PKWY
LANCELOT LN
EDGERTON RD
VALLEY PKWY
S. AKINS
MARTIN DR
LOUIS DR
LINDBERGH DR
STATE RD
CREEKSIDE
WATERBRIDGE
RIVERVIEW
Total Imperviousness = 25 percent

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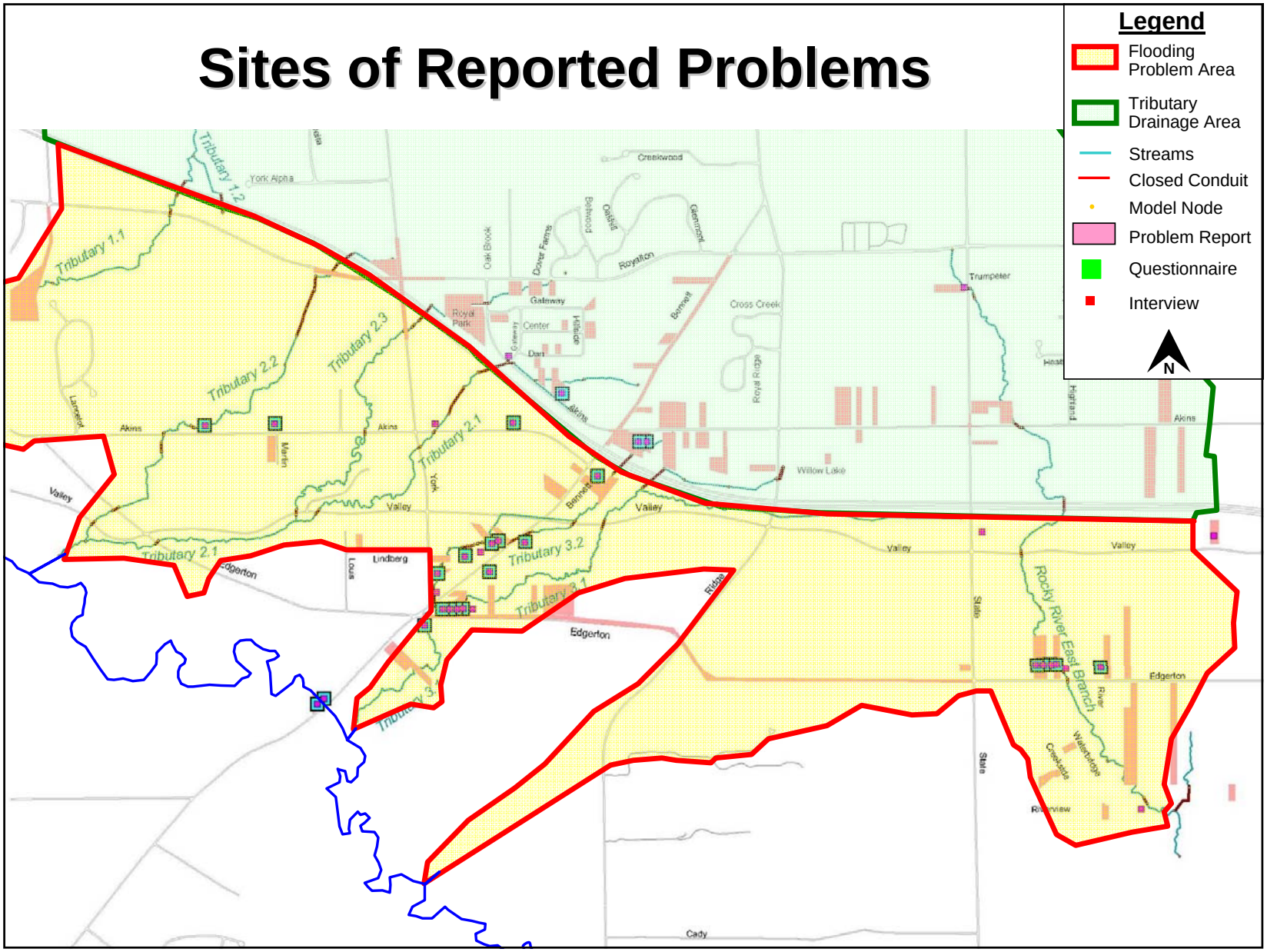
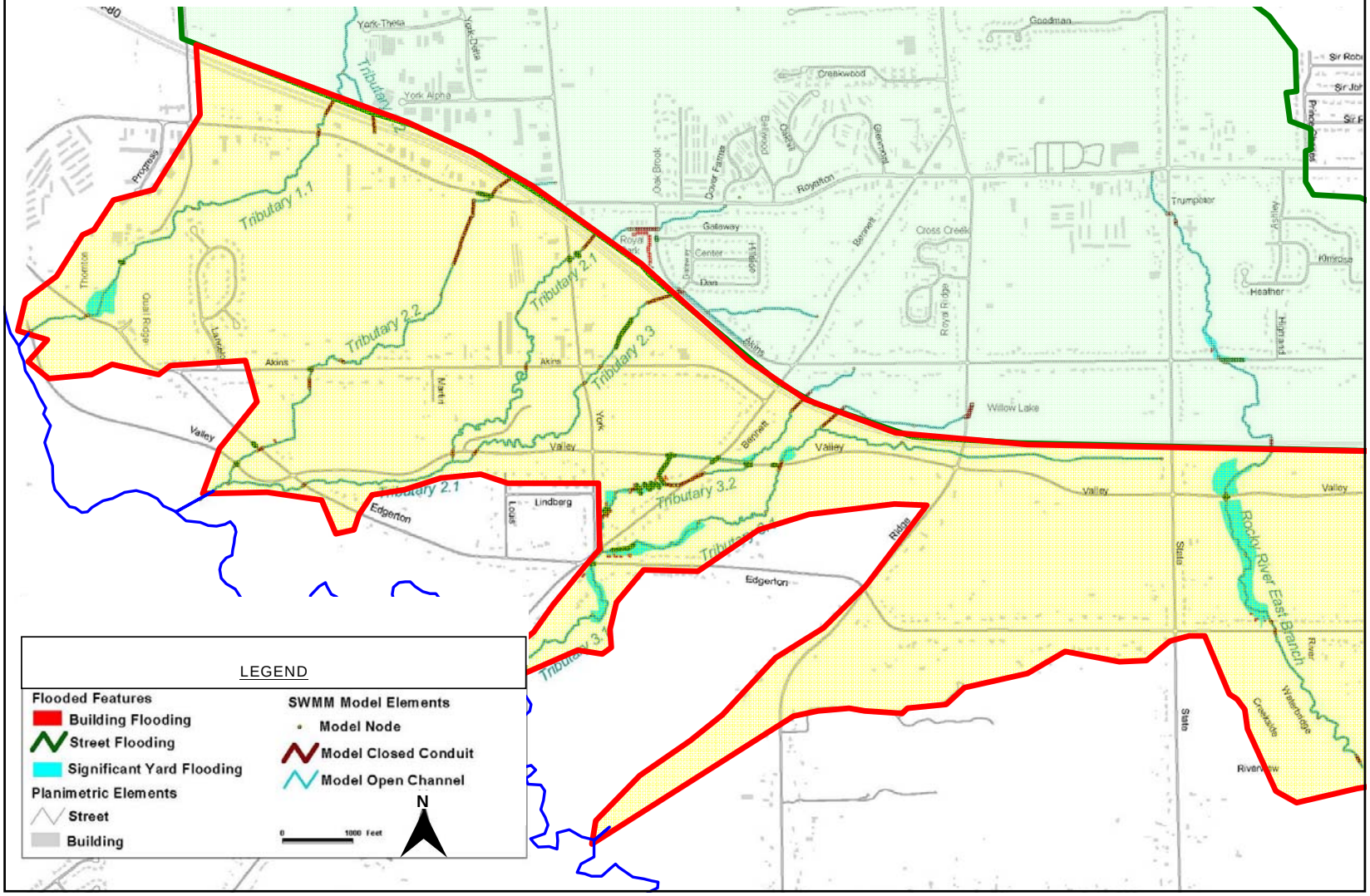
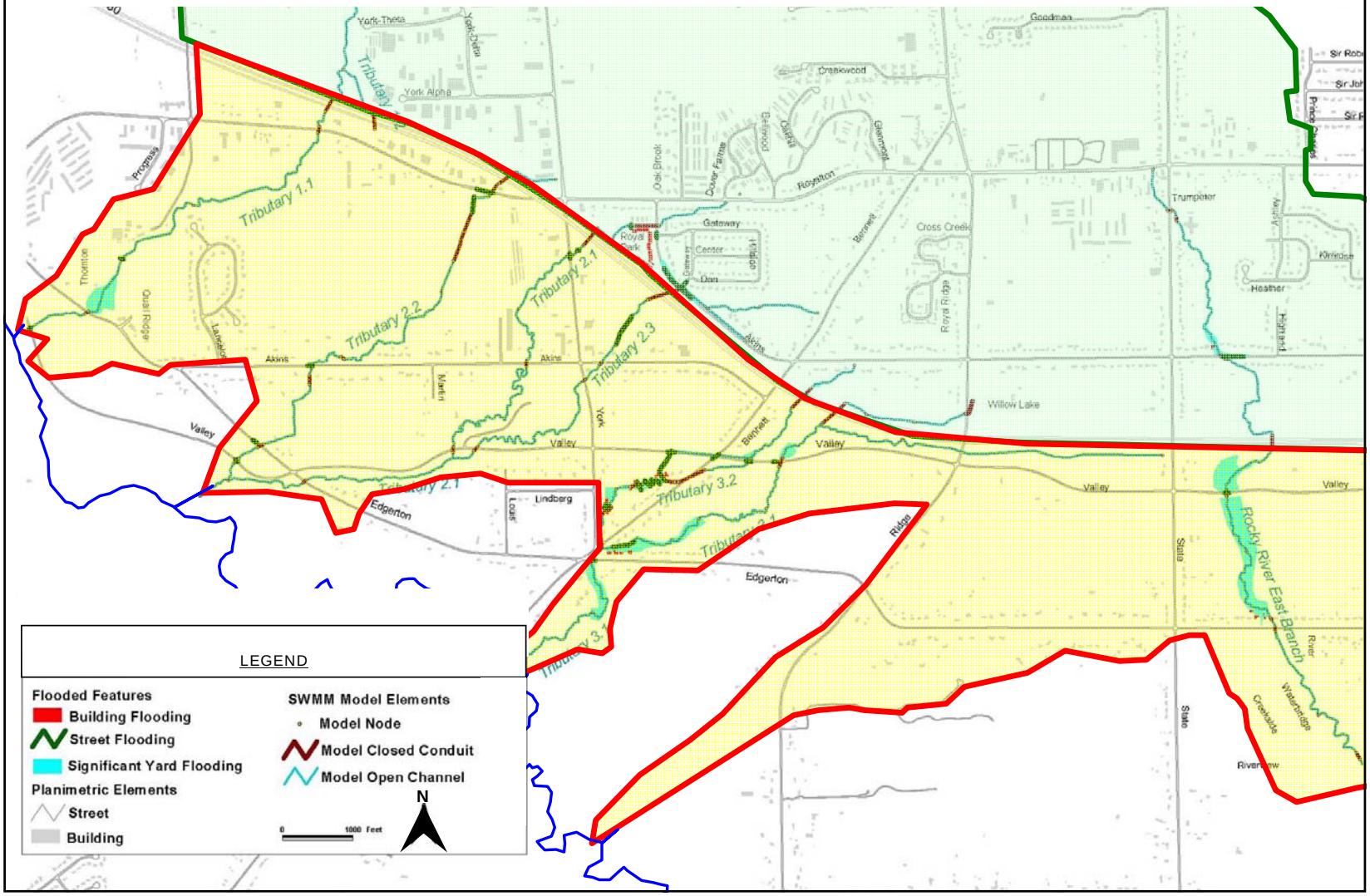
Sites of Reported Problems



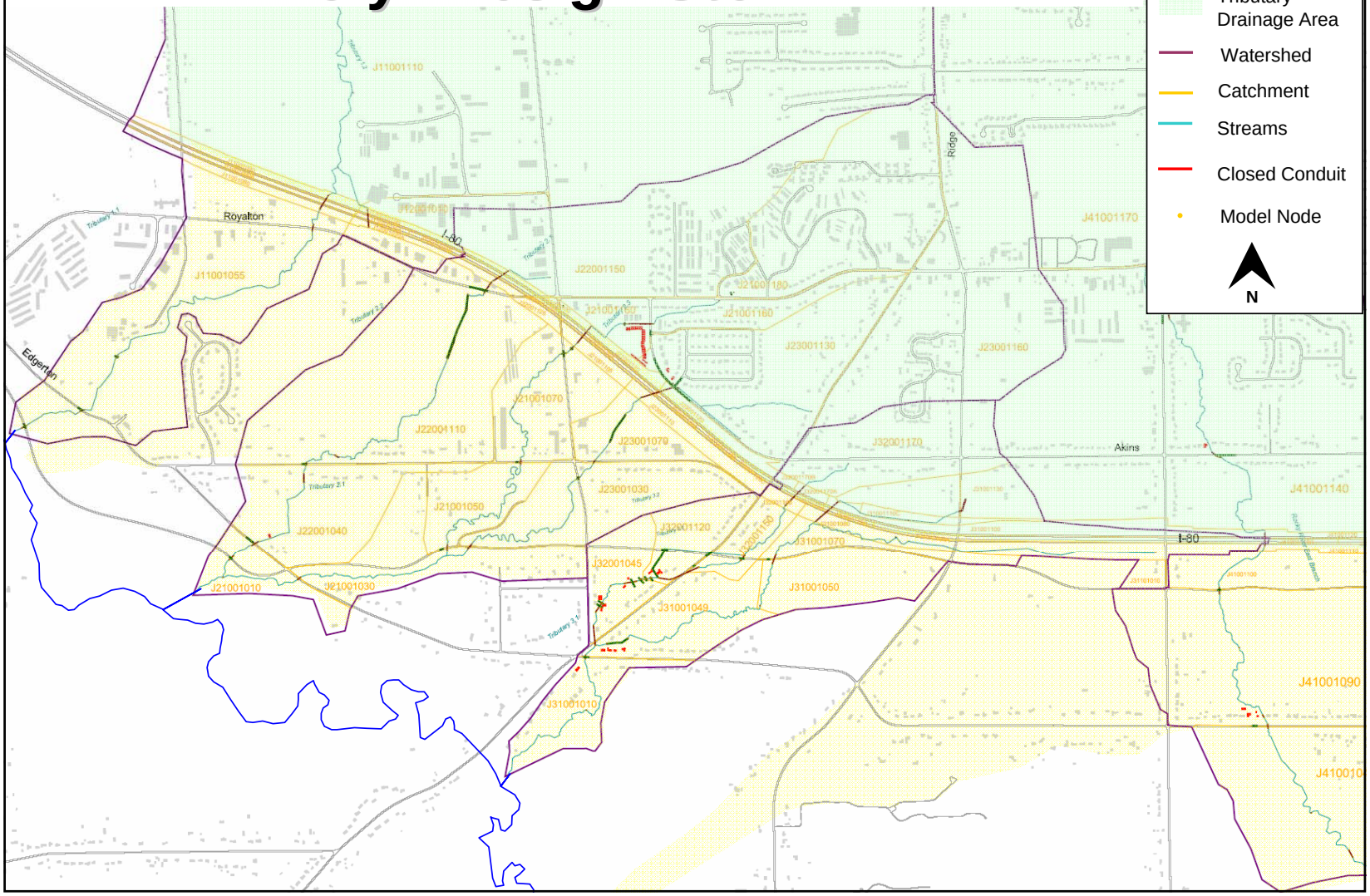
Flooding Model: May 22, 2004



Flooding Model: June 9, 2004



Projected Flooding Model: 25-yr Design Storm



Flooding Problem Assessment

- Flooding during May - June 2004 appears equivalent to a design flood with a 2-year to 10-year recurrence period.
- Changes in land cover since 1993 do not appear to have significantly affected the location and severity of flooding.
- Several factors influence flooding:
  - Various drainage improvements and floodplain encroachments on private property.
  - Increased runoff from the Ohio Turnpike have elevated flood stages by 0.1 ft or less.
  - Siltation of culverts under Valley Parkway redirects flow to alternative overland routes.

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How does Turnpike Expansion Change Drainage?

- More pavement = more runoff
- Removal of grass medians and shoulders speeds runoff
- Installation of storm inlets and sewers speeds runoff
- Changes in road crown re-direct runoff

Assessment of Turnpike Expansion on Drainage

- Except for Tributary 3, turnpike runoff represents a small fraction of total runoff
- The most severe effects of turnpike runoff appear to be very localized:
  - At turnpike storm drain outlets
  - Within ditches parallel to turnpike
- Turnpike culverts do not affect upstream flooding
- Increased runoff from the turnpike affects erosion more than flooding
  - Visual evidence of erosion
  - Siltation at Valley Parkway Culverts
  - Modeling shows minimal flood stage increases

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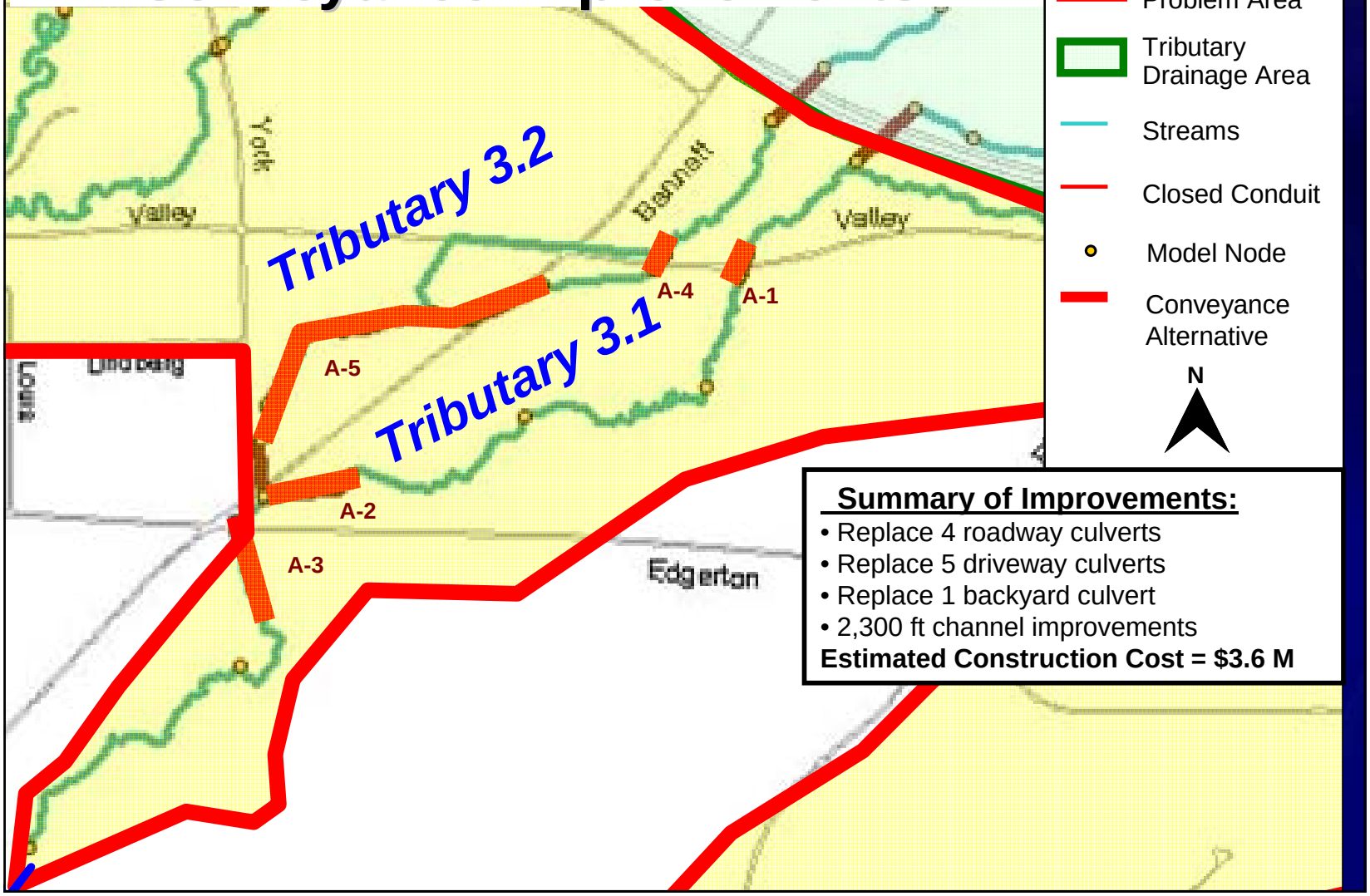
Alternatives were developed for the following problems:

- Flooding affected by Ohio Turnpike expansion (limited to Tributary 3)
- Flooding during the 25-year design storm that:
  - Reaches the foundation of structures
  - Inundates roadways

Baseline Alternatives

- Remove Drainage System Obstructions
- Preserve Existing Floodplains
- Control Increased Runoff from Future Development

Alternative A: Conveyance Improvements

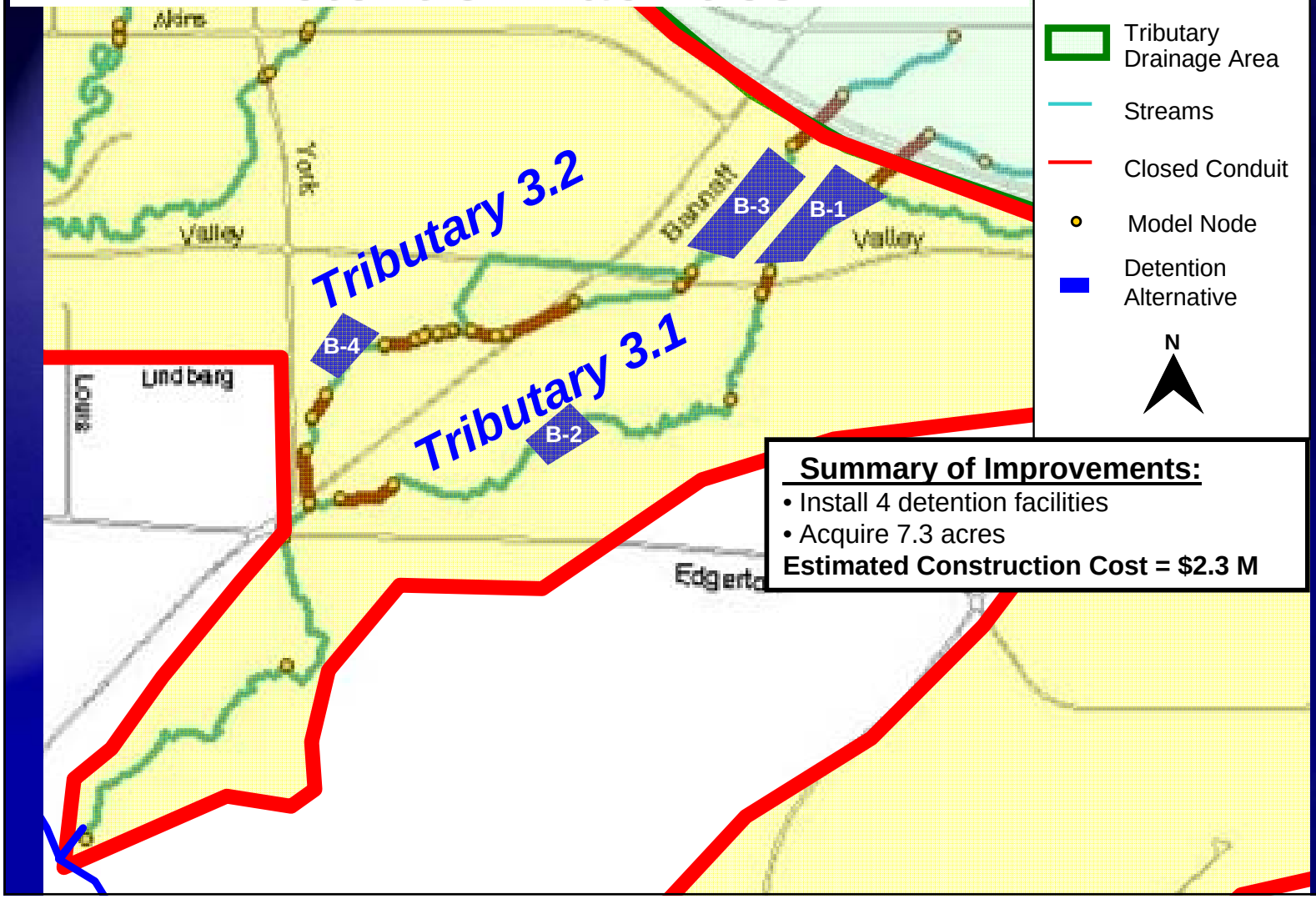


Summary of Improvements:

- Replace 4 roadway culverts
- Replace 5 driveway culverts
- Replace 1 backyard culvert
- 2,300 ft channel improvements

Estimated Construction Cost = $3.6 M

Alternative B: Detention Facilities

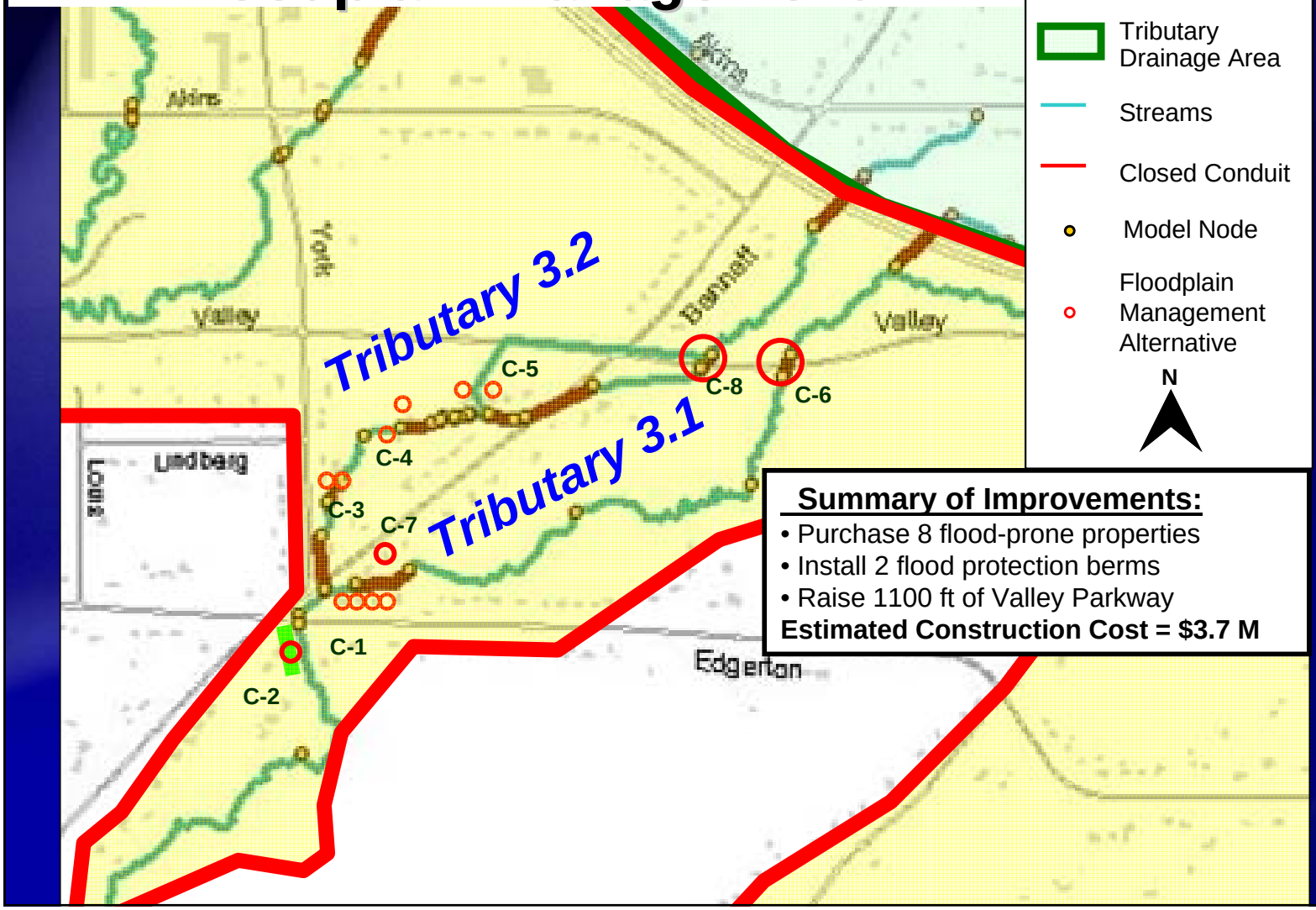


Summary of Improvements:

- Install 4 detention facilities
- Acquire 7.3 acres

Estimated Construction Cost = $2.3 M

Alternative C: Floodplain Management

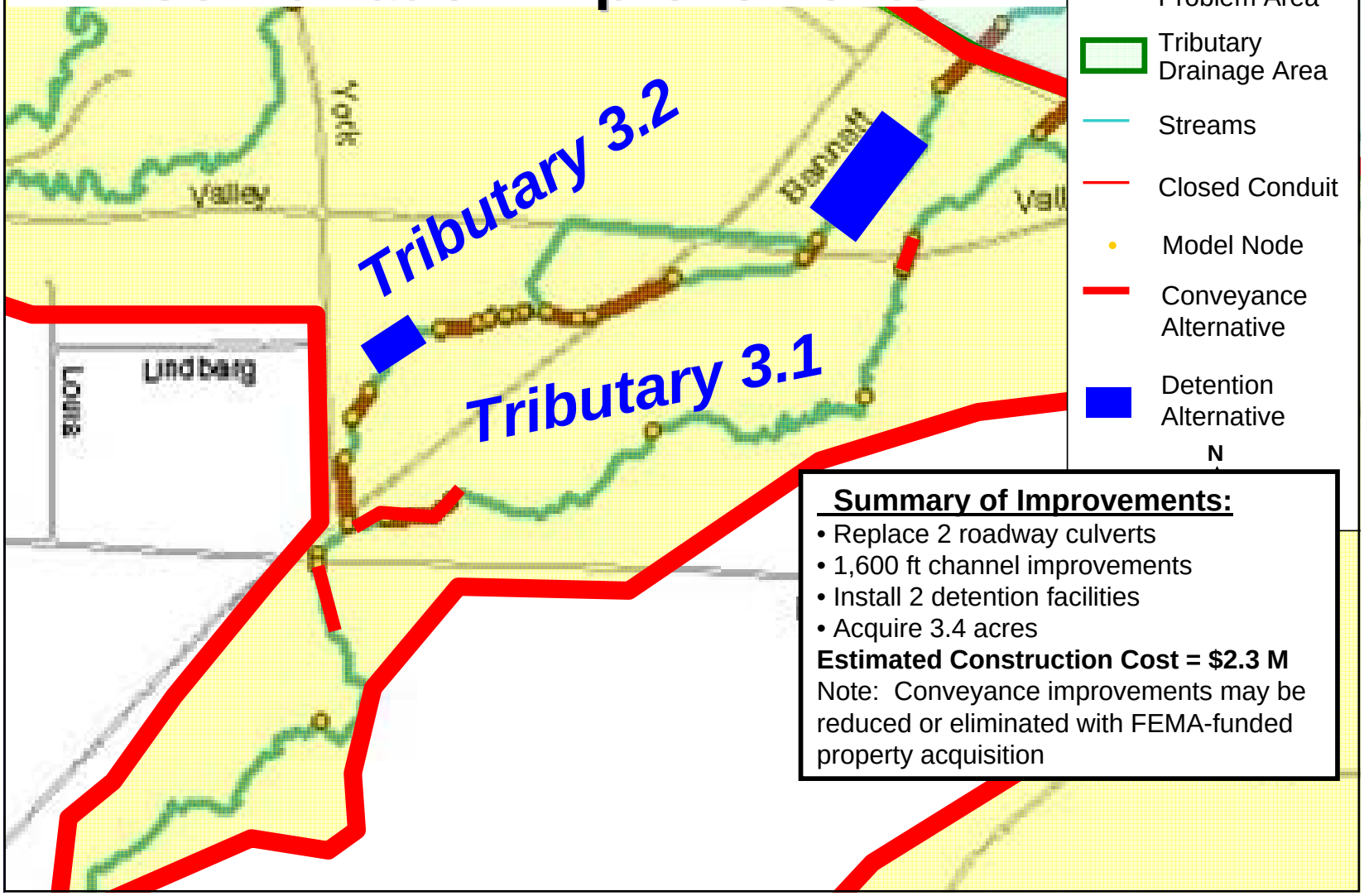


Summary of Improvements:

- Purchase 8 flood-prone properties
- Install 2 flood protection berms
- Raise 1100 ft of Valley Parkway

Estimated Construction Cost = $3.7 M

Alternative D: Combination Improvements



Summary of Improvements:

- Replace 2 roadway culverts
- 1,600 ft channel improvements
- Install 2 detention facilities
- Acquire 3.4 acres

Estimated Construction Cost = $2.3 M

Note: Conveyance improvements may be reduced or eliminated with FEMA-funded property acquisition

Alternative Evaluation

Evaluation Criterion	Weight	Alternative			
		A	B	C	D
Cost	?	$3.6 M	$2.3 M	$3.7 M	$2.3 M
Flood Control Effectiveness	?	Prevents building flooding and roadway inundation during the 25-year design storm			
Compatibility with Community Interests	?	Coordination w/ Property Owners	Facilities within MetroParks	Acquisition of Residences	Balanced property / MetroPark Impacts
Consistency with Regulatory Requirements	?	Requires OEPA / ACOE Permits	Requires OEPA / ACOE Permits	No permits required	Requires OEPA / ACOE Permits
Water Quality Enhancement	?	Negative w/o restoring stream habitat	Positive – co-locate WQ pond	Neutral	Balances Alternatives A and B
Implementation	?	Requires Extensive coordination with residents and Cleveland MetroParks			

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Next Steps

- Receive neighborhood comments
- Finalize report
- Secure funding
  - City
  - FEMA
  - Property owners
- Develop solutions for other problems
  - Flooding
  - Erosion

Questions?