MANAGING STORMWATER FOR THE IMPROVED RESILIENCY OF ROADWAYS AND DRAINAGE SYSTEMS

Geoffrey Scott, PE

Cornell Local Roads Program

WEATHER PATTERNS……

- *Change storm Impacts:*
  - *more intense*
  - *heavier short rainfall*

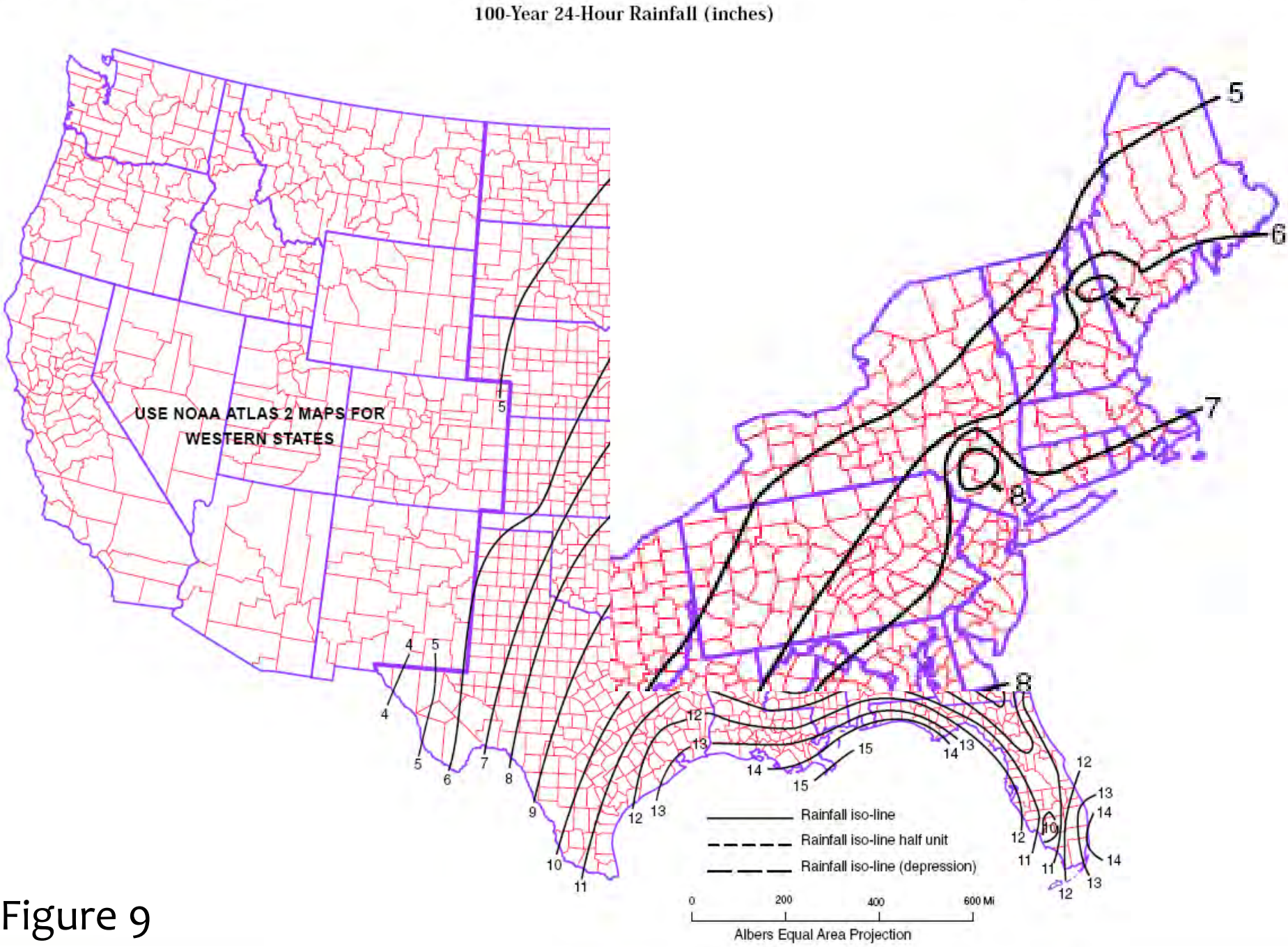
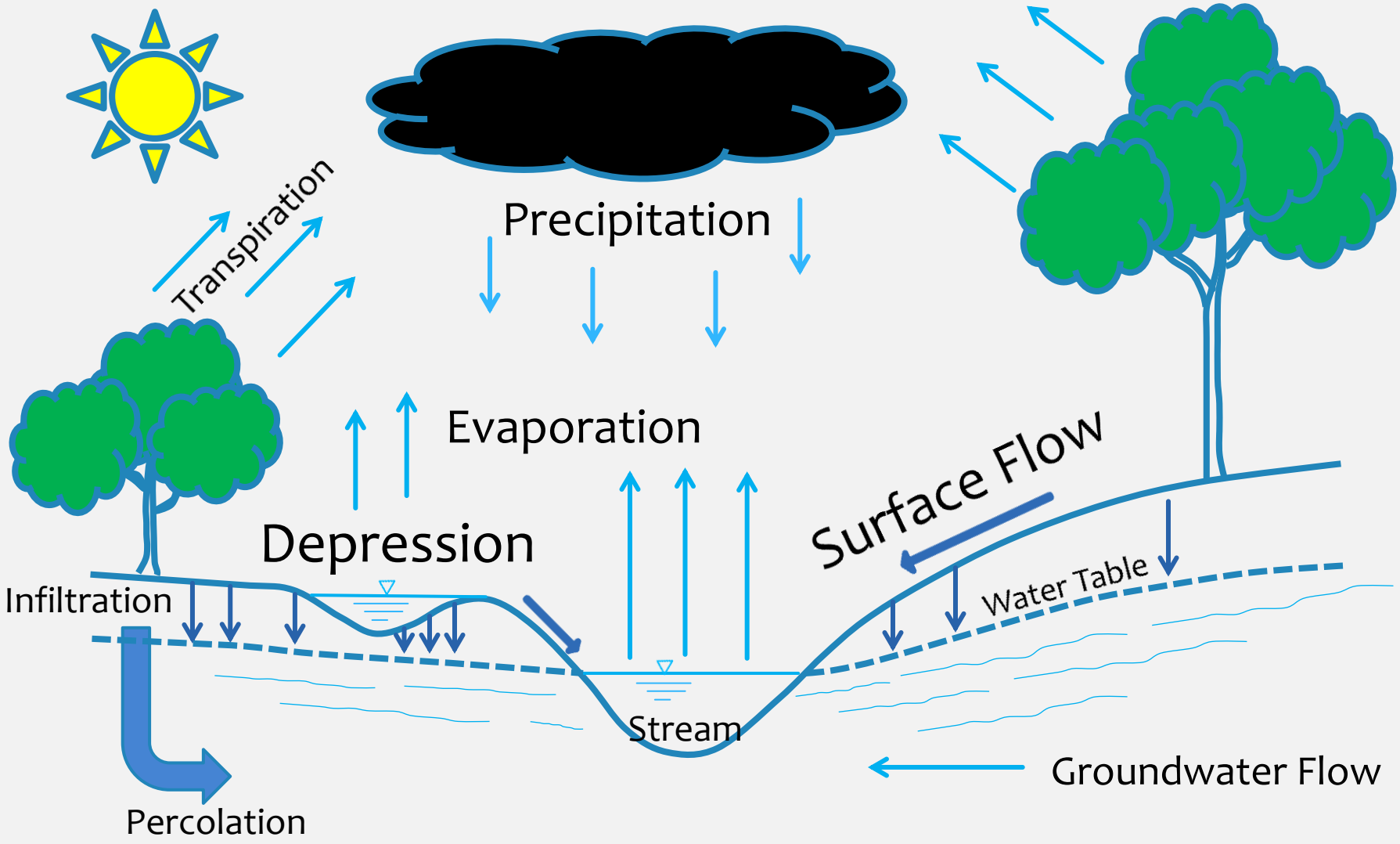
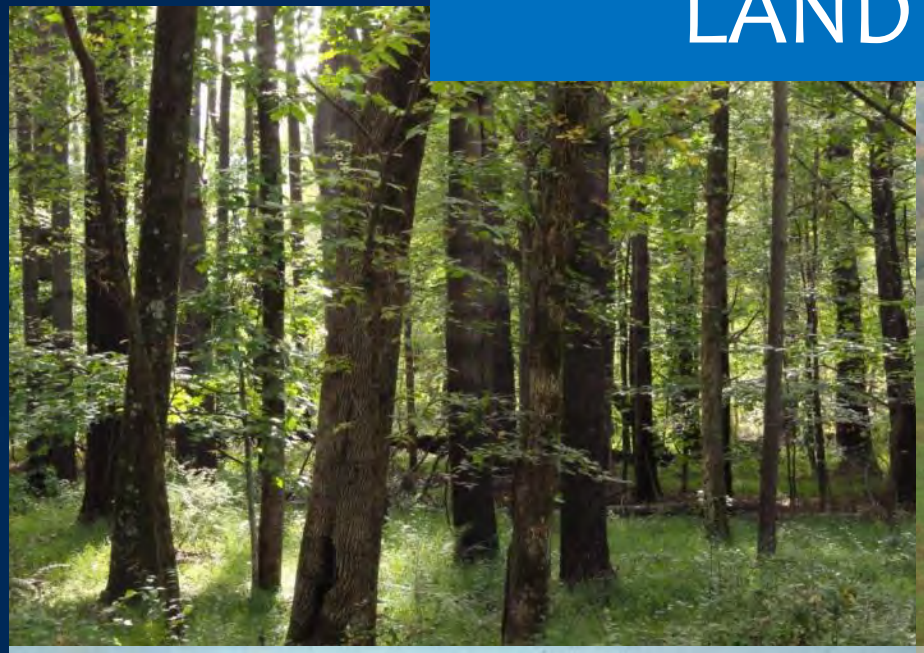

100-Year 24-Hour Rainfall (inches)
USE NOAA ATLAS 2 MAPS FOR WESTERN STATES
Rainfall iso-line
Rainfall iso-line half unit
Rainfall iso-line (depression)
0 200 400 600 Mi
Albers Equal Area Projection

Figure 9

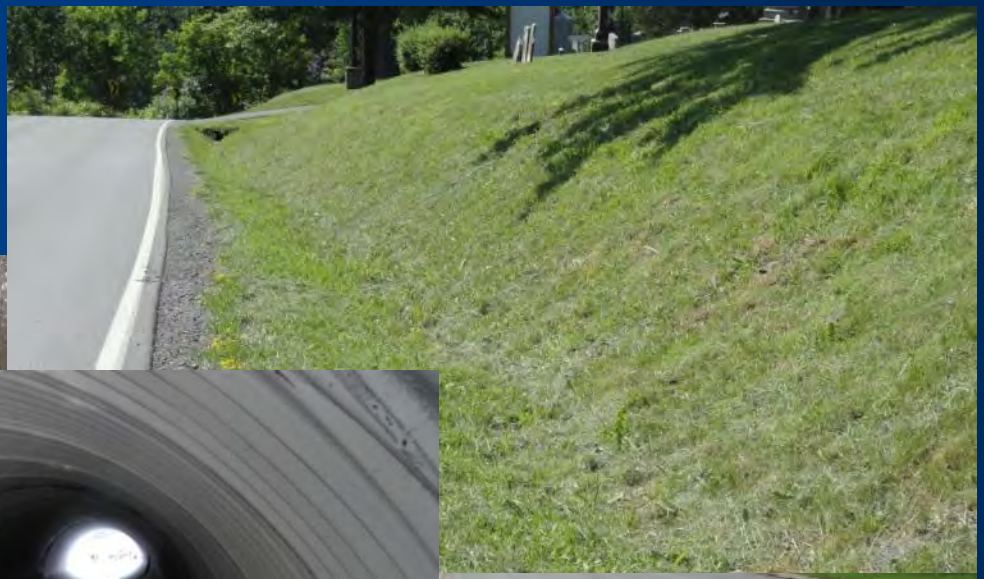

Transpiration
Precipitation
Evaporation
Surface Flow
Depression
Infiltration
Water Table
Stream
Groundwater Flow
Percolation

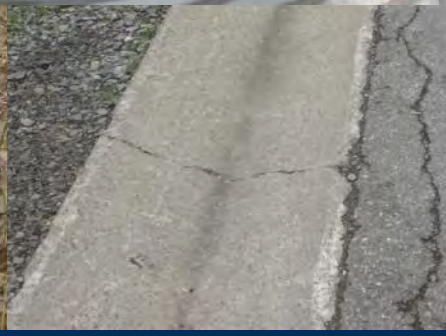
Water Cycle

LAND USE



DRAINAGE TYPES





HIGHWAY DRAINAGE PROBLEMS

Excess Flow
Sedimentation
Poor Culvert Condition
High Velocity
Perpendicular Flow

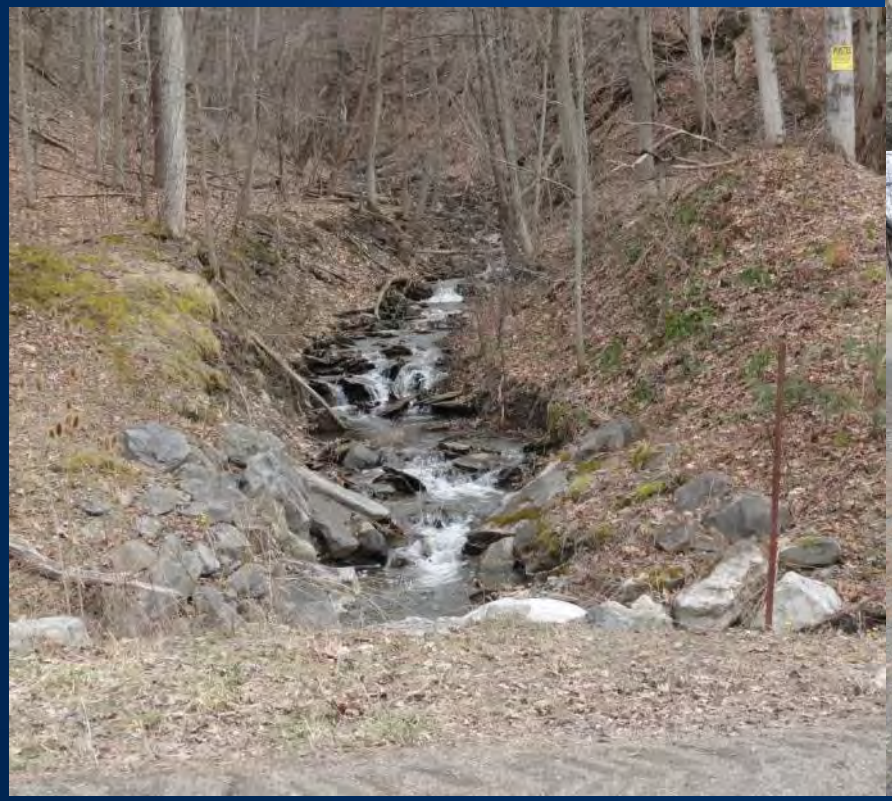
EXCESS FLOW

OVER TOPPING

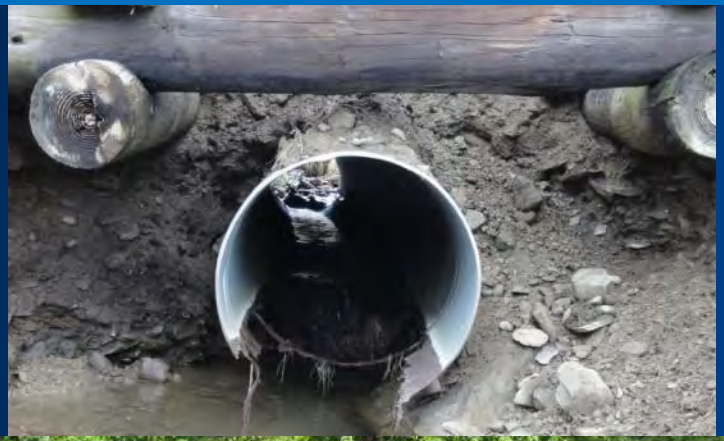
HIGH VELOCITY

SEDIMENTATION

PERPENDICULAR FLOWS



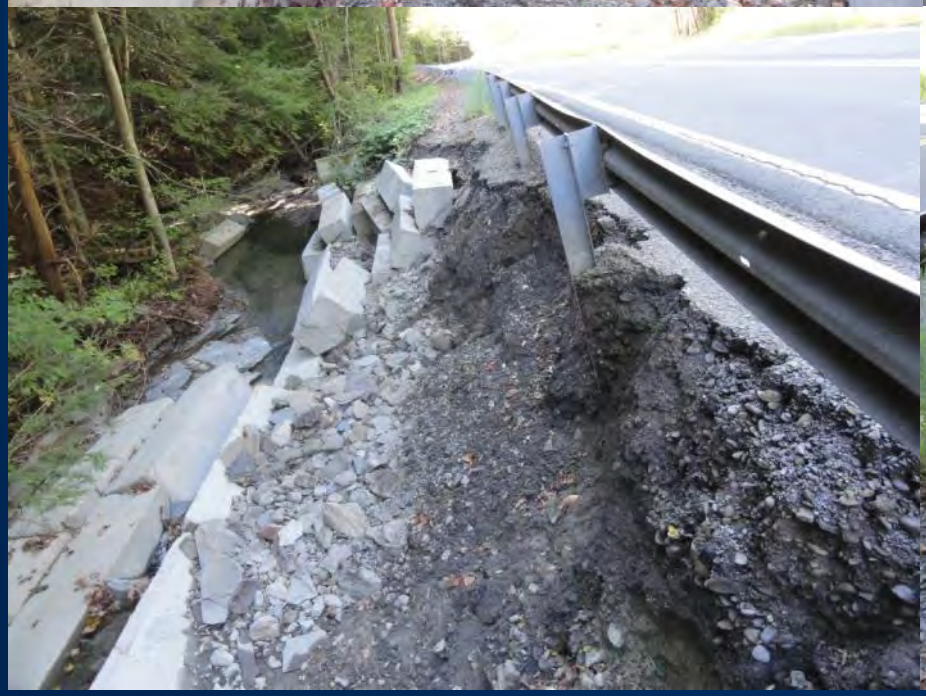
POOR CULVERT CONDITION



WHAT CAN BE DONE?

Inspections
Reduce Volume
Reduce Velocity
Stabilize

INSPECTIONS



DIVERSION

- *Reduce Volume*

DIVERSION :

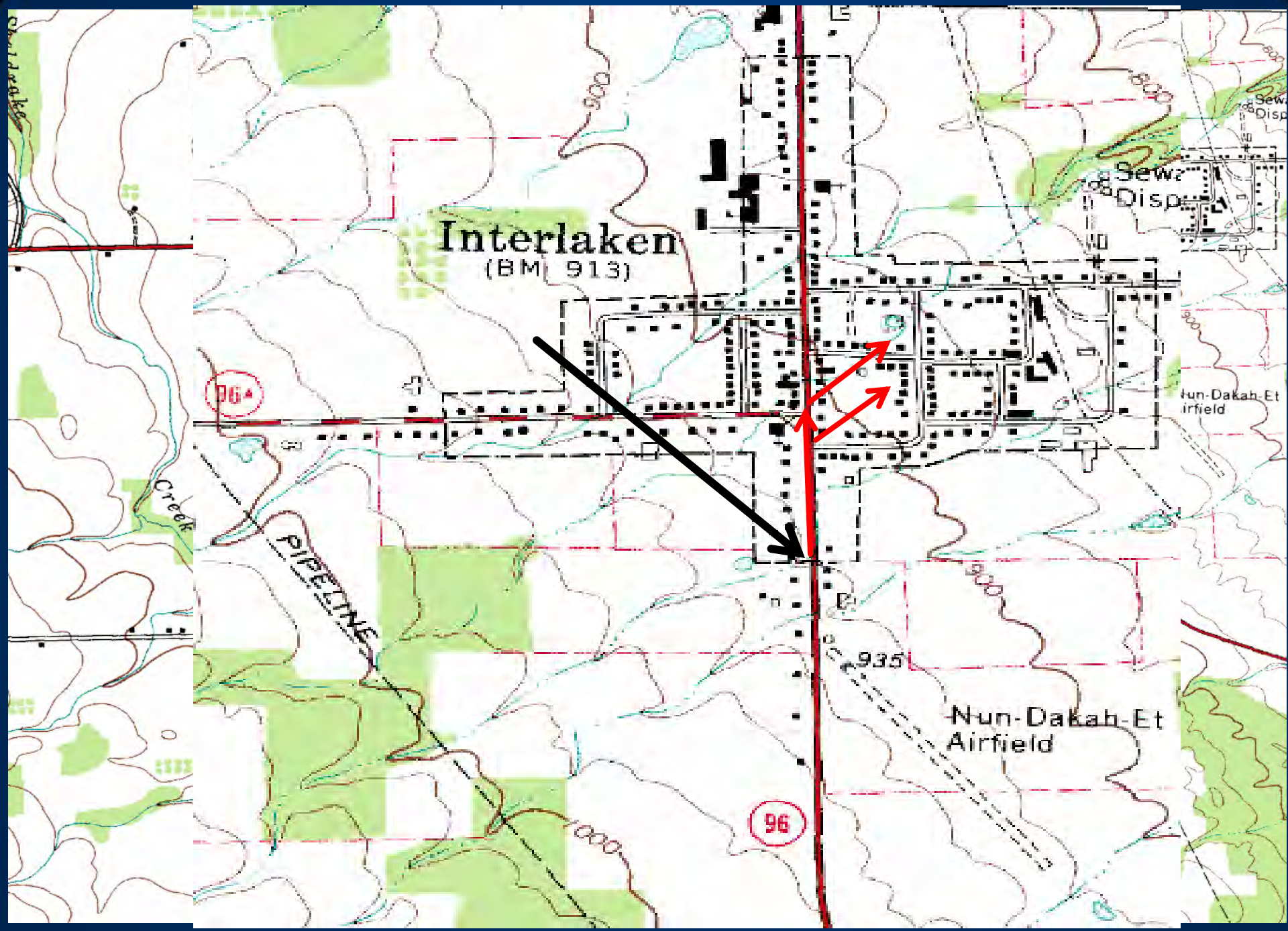
STORAGE:

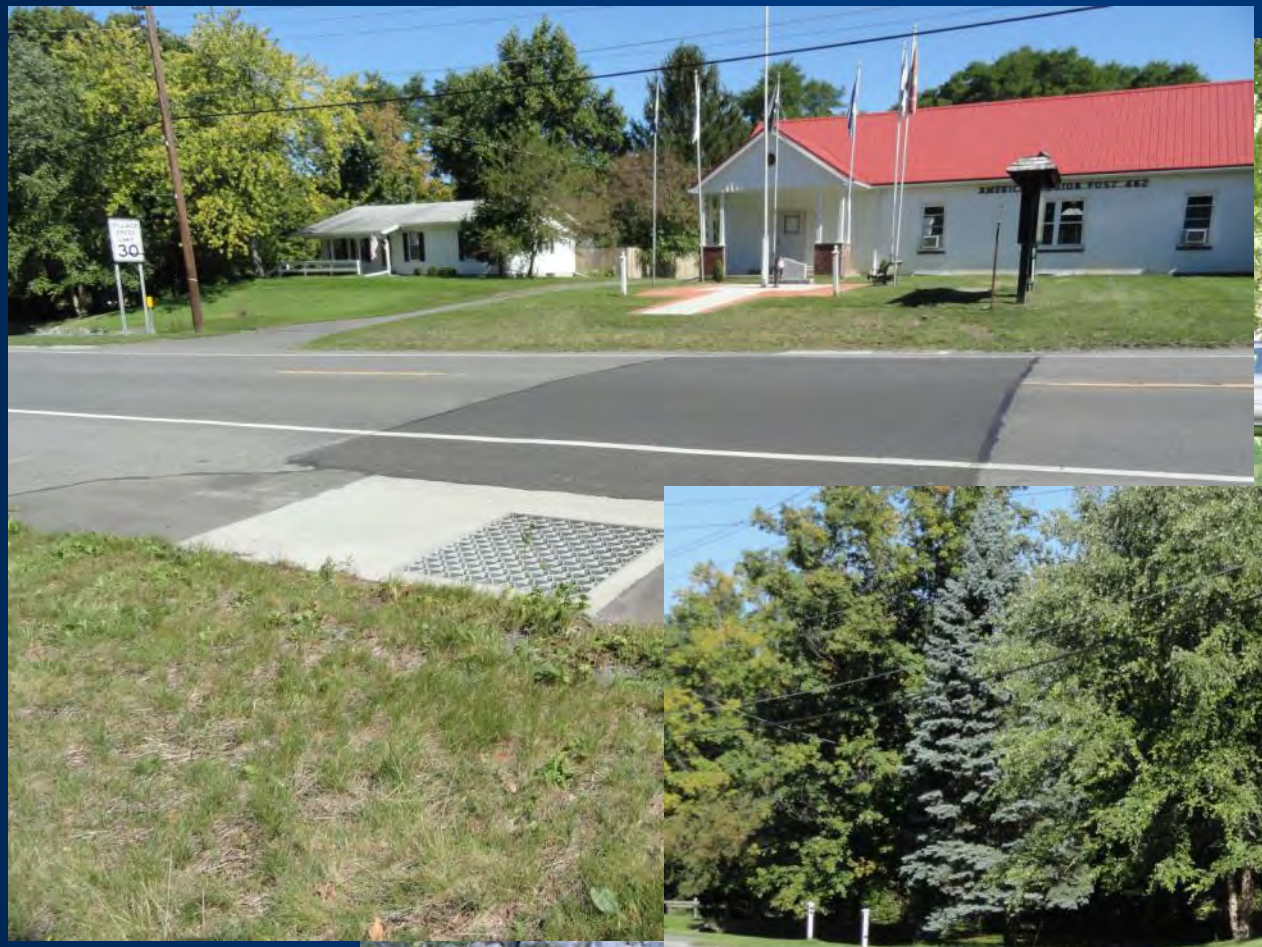
Retention/Detention Ponds/Wetlands

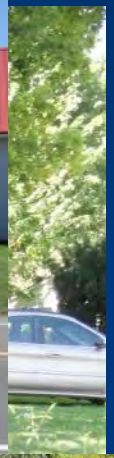
- *Reduce Volume*

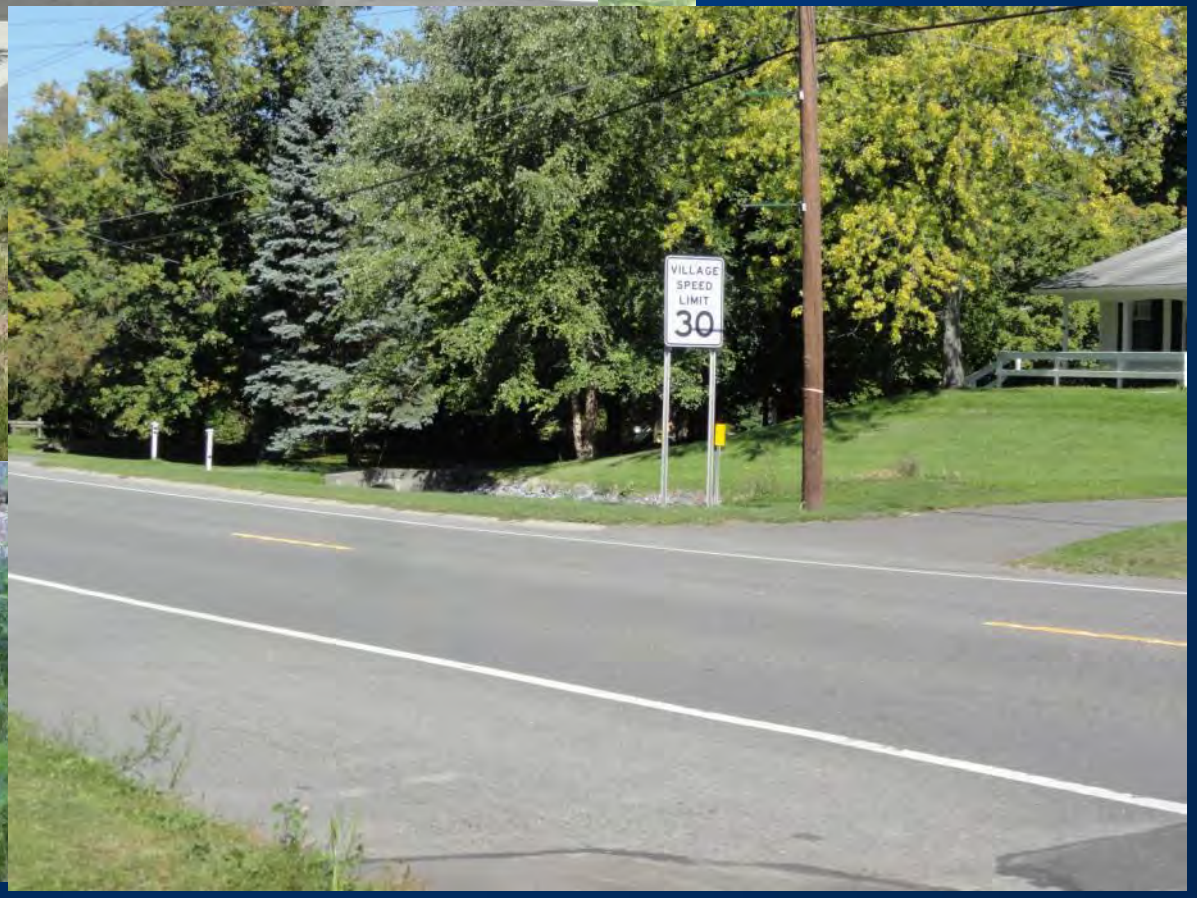
VILLAGE OF INTERLAKEN

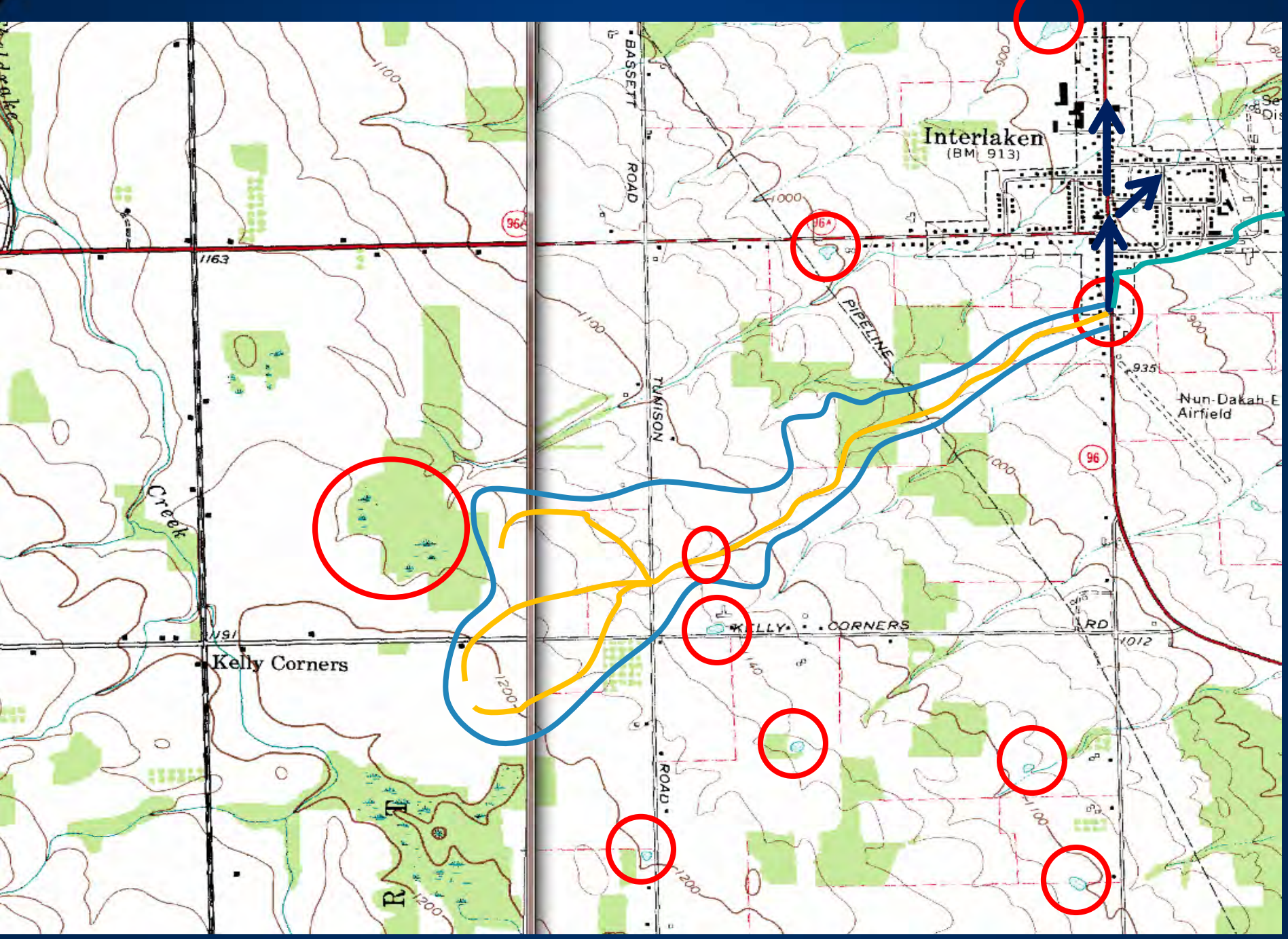
Flooding


Interlaken
(BM 913)
96A
96
PIPELINE
Creek
935
1000
Nun-Dakah-Et
Airfield

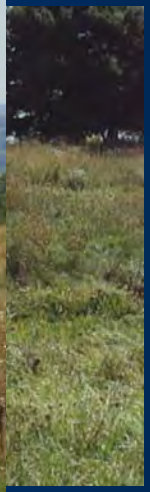

30

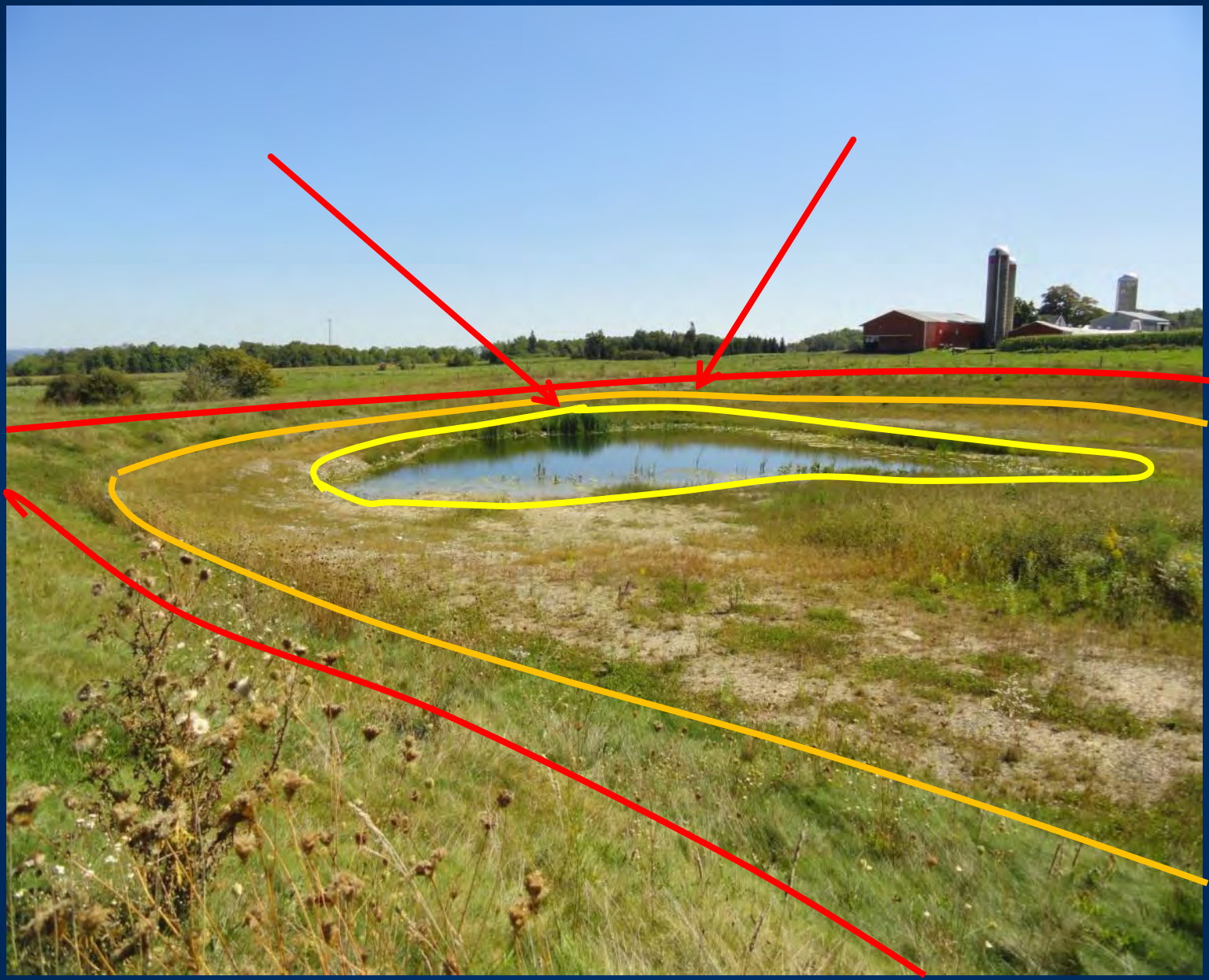



VILLAGE
SPEED
LIMIT
30


Interlaken
(BM 913)
BASSETT ROAD
TUNISON ROAD
PIPELINE
Kelly Corners
KELLY CORNERS RD
Creek
Nun-Dakah-E
Airfield
96A
96
1163
1191
1012
1100
1000
900
935
1200
1400





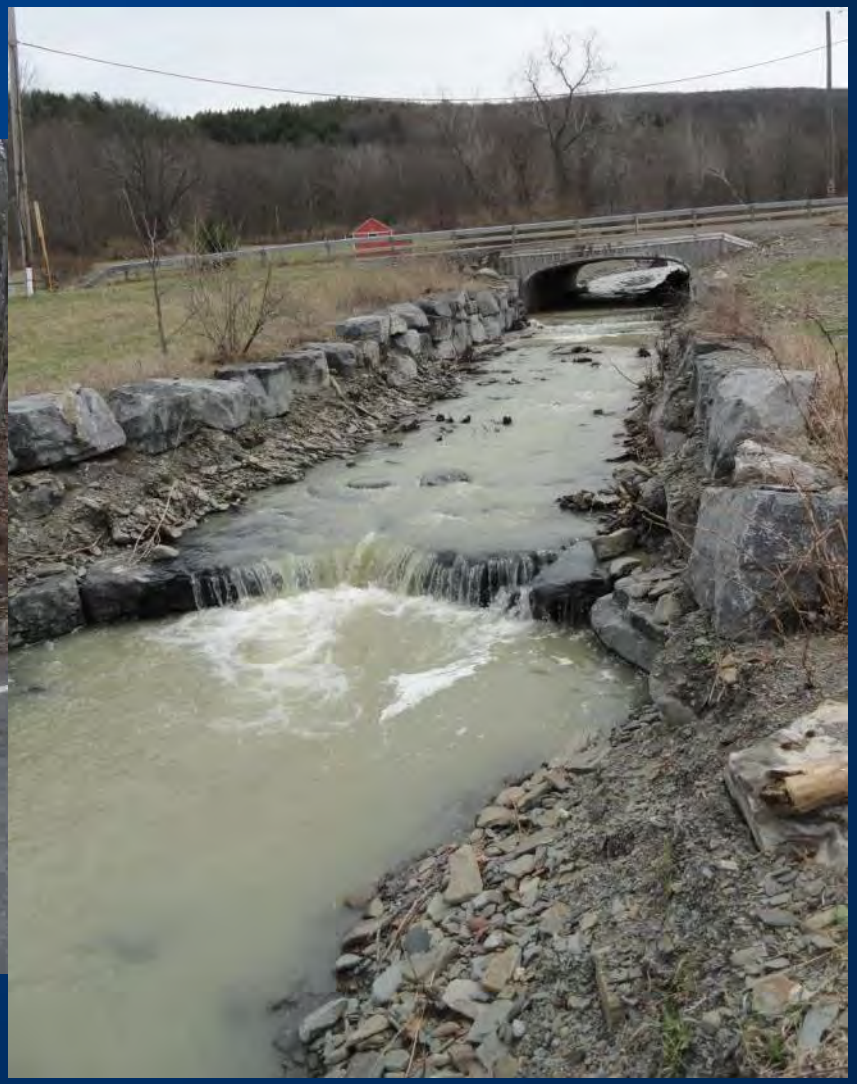


REDUCE VELOCITY

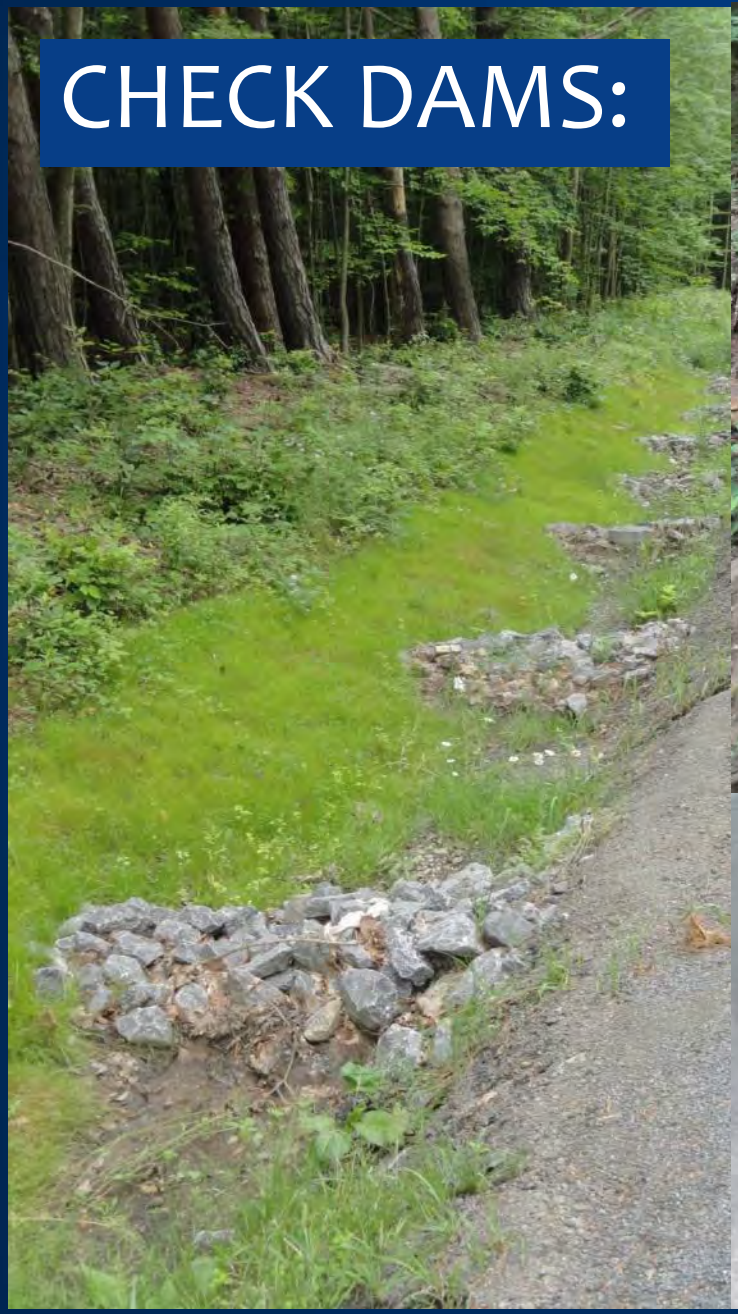
- *Slow the Flow Down!*

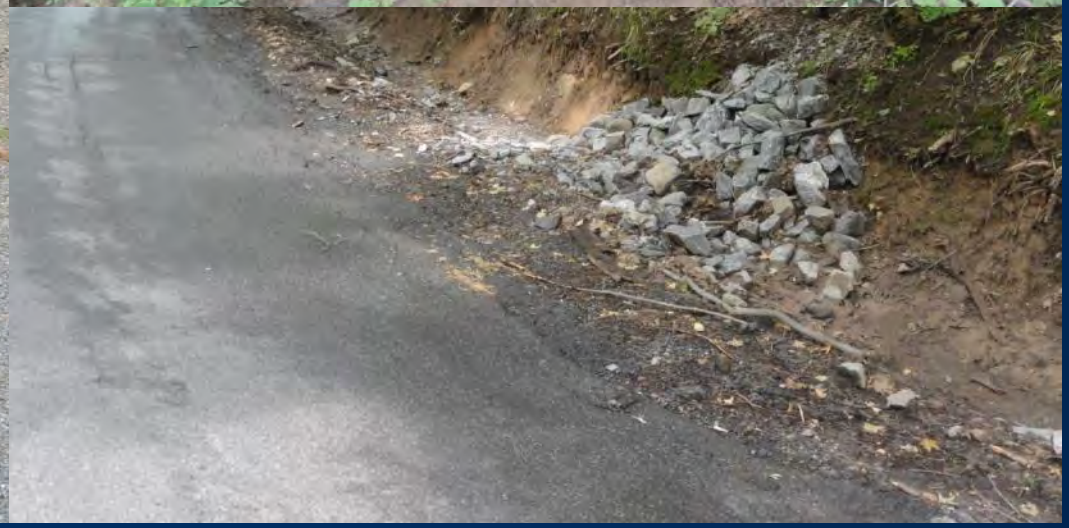
VERTICAL DROPS

Reduce Velocity



CHECK DAMS:





CHECK DAMS:

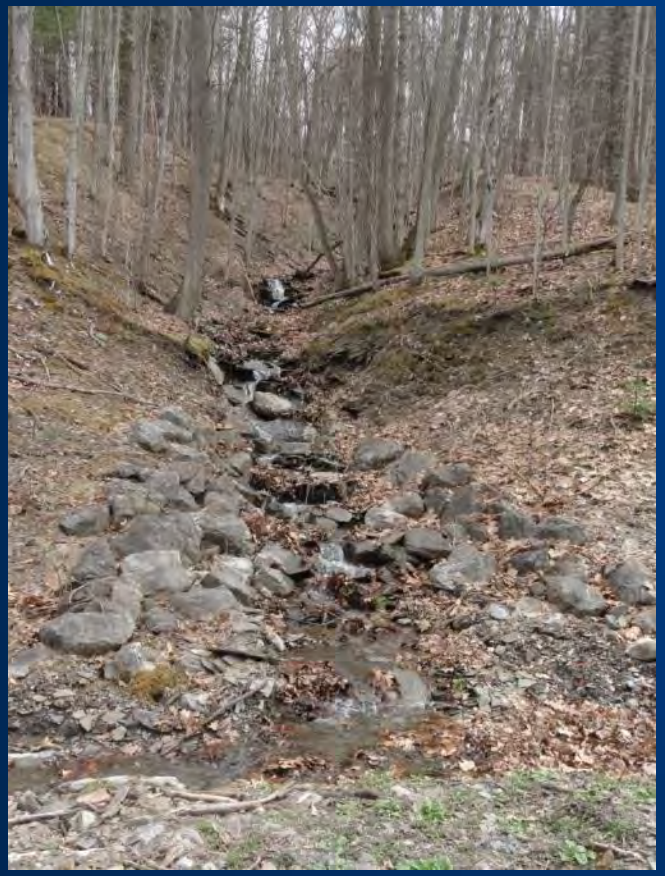
Reduce Velocity

RIP RAP OUTLETS

SPLASH POOL

STABILIZE & PROTECT

STABILIZE

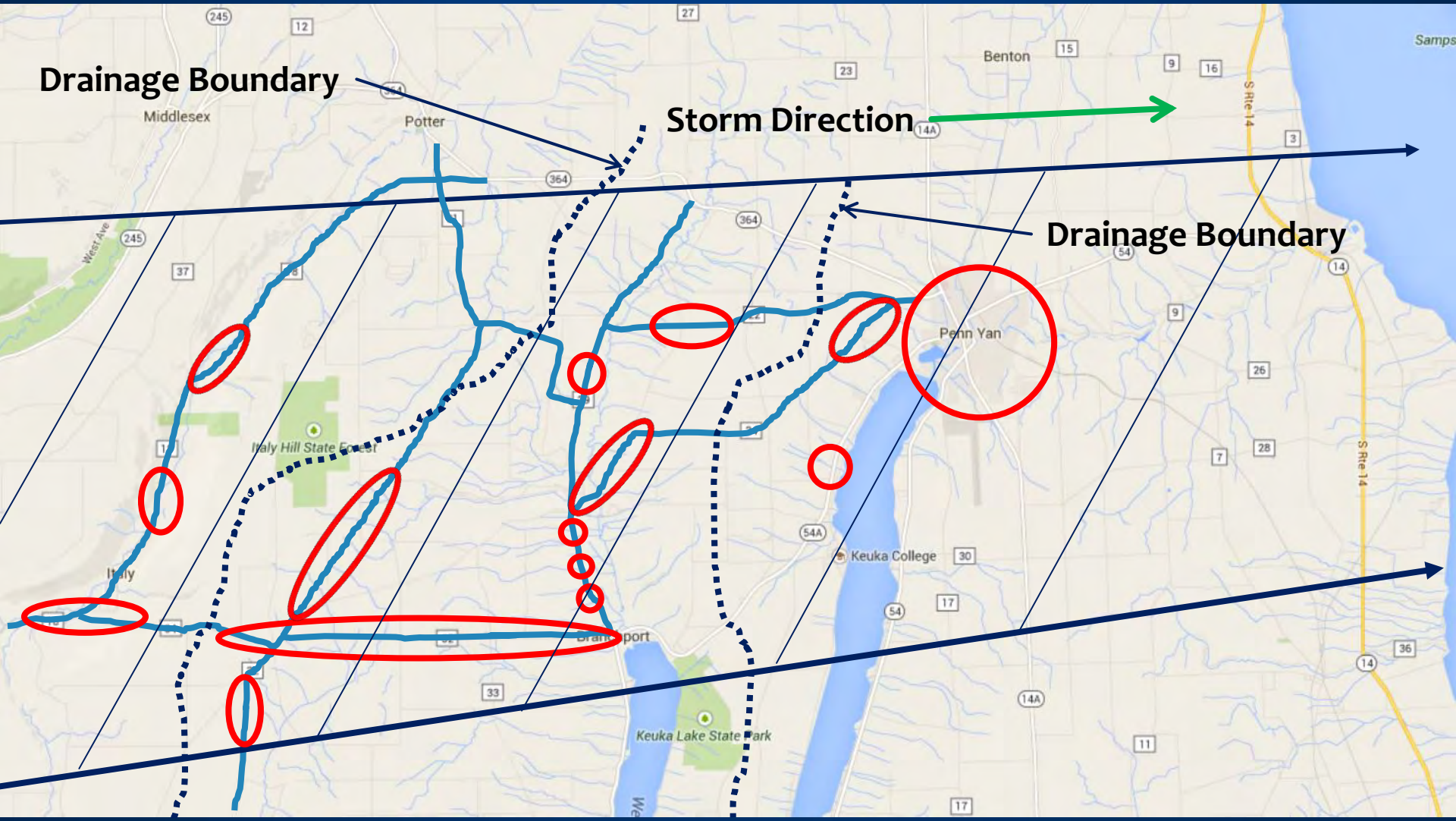


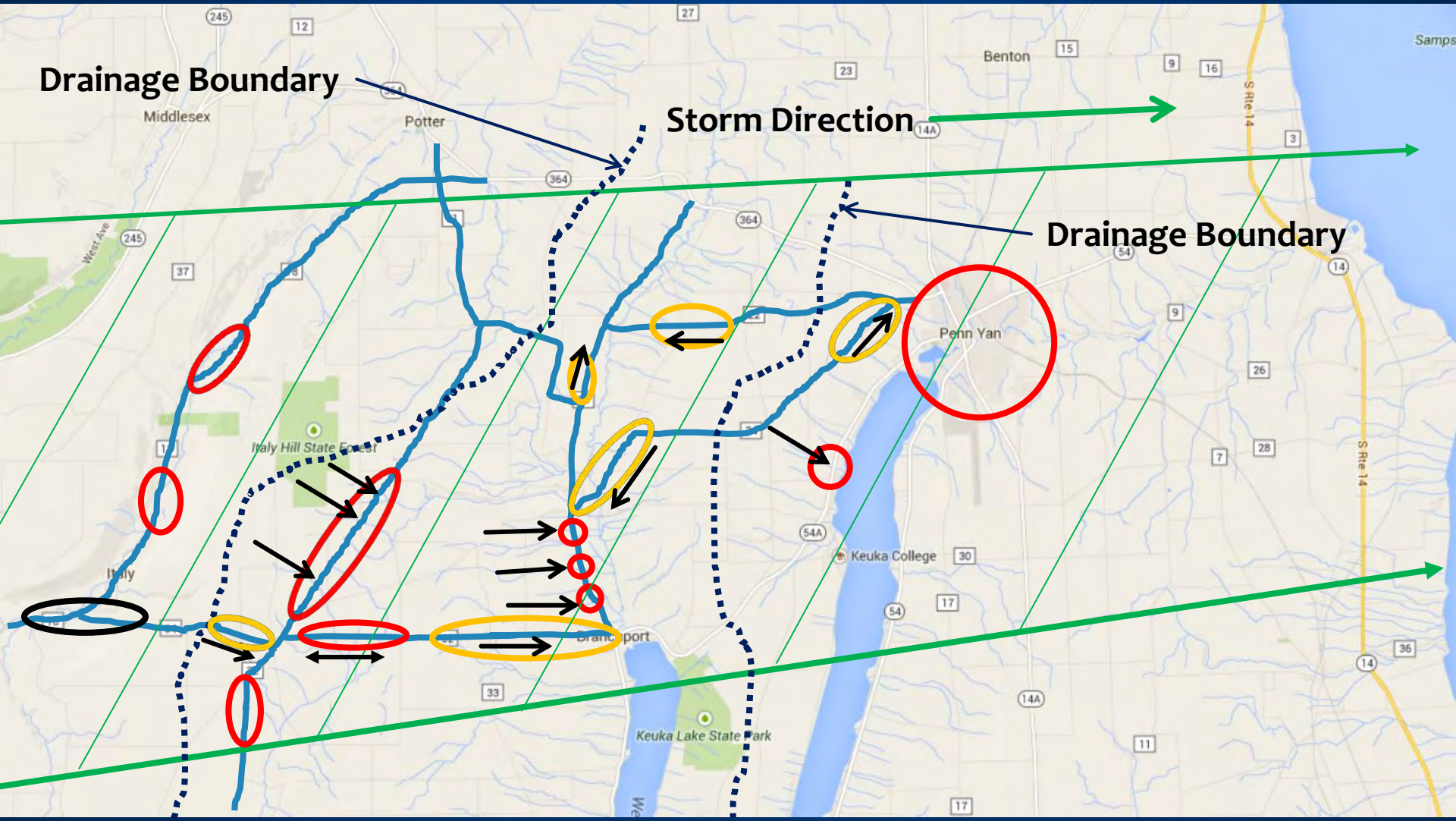
STABILIZE

STABILIZE

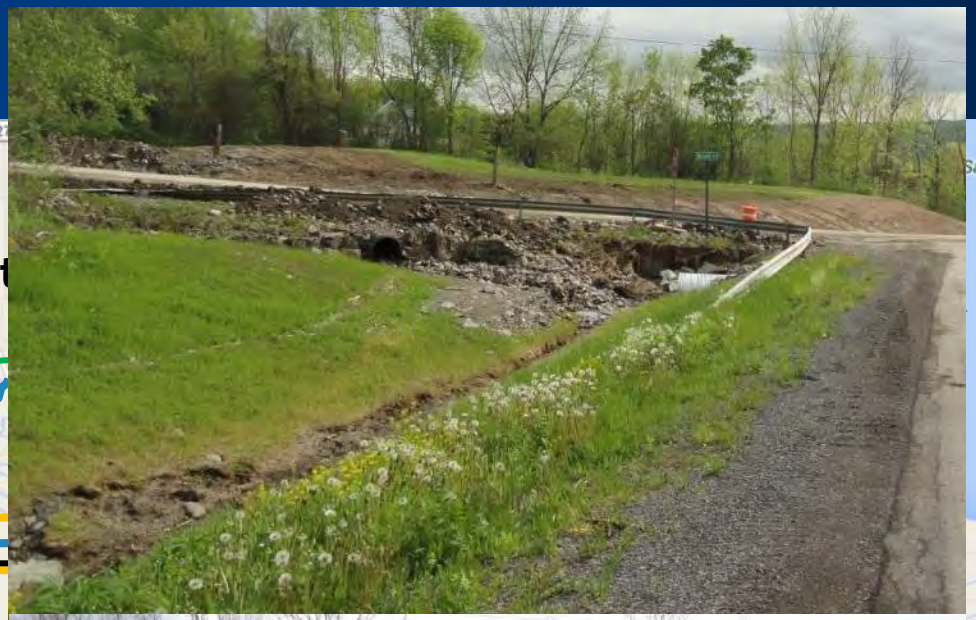
OTHER METHODS

PENN YAN

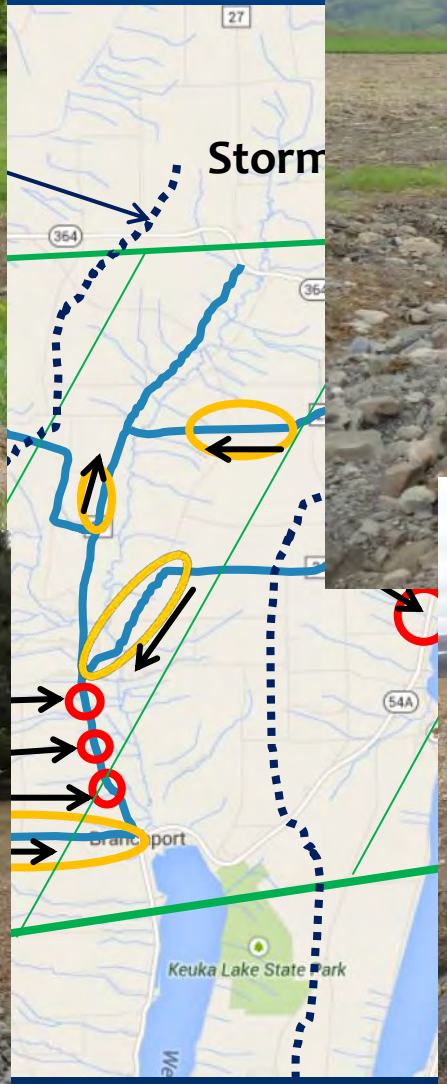

Drainage Boundary
Storm Direction
Drainage Boundary
Middlesex
Potter
Benton
Penn Yan
Italy Hill State Forest
Italy
Keuka College
Keuka Lake State Park
S Rte 14

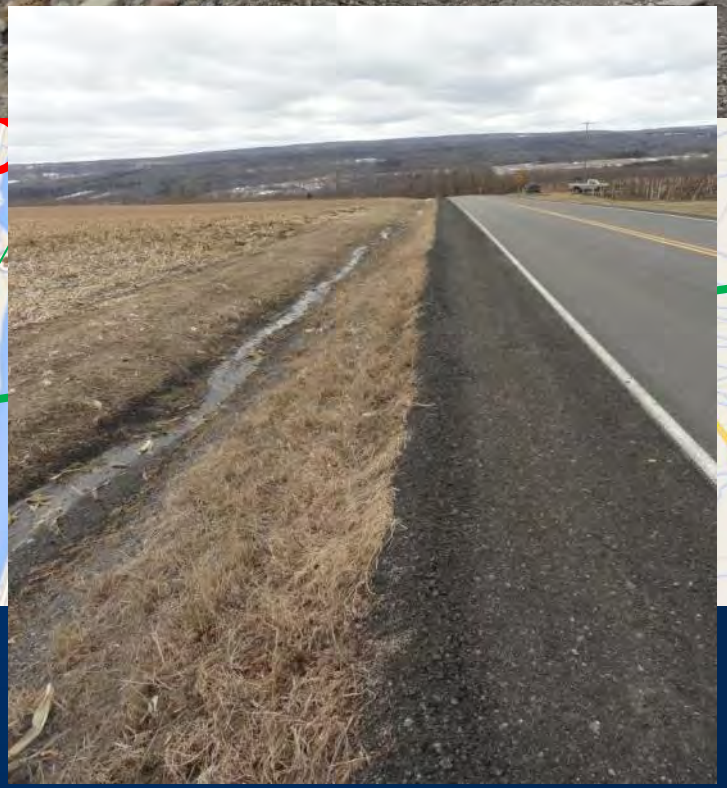

Drainage Boundary
Storm Direction
Drainage Boundary
Middlesex
Potter
Benton
Penn Yan
Italy Hill State Forest
Italy
Keuka College
Keuka Lake State Park
Branchport
West Ave
S Rte 14
S Rte 14

Drainage




364
Keuka La


Storm
27
364
54A
Keuka Lake State Park



How do you Improve Resiliency in Managing Stormwater?

- *Reduce the Volume*
- *Reduce the Velocity*
- *Stabilize*
- *Inspect*
- *Maintain!*

THANK YOU!

Geoffrey Scott, PE
Cornell Local Roads Program
grs78@cornell.edu