# TRANSPORTATION PLANNING PERFORMANCE MEASUREMENT USING GIS

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Clark County, NV

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greensboro urban area MPO metropolitan planning organization

# Overview

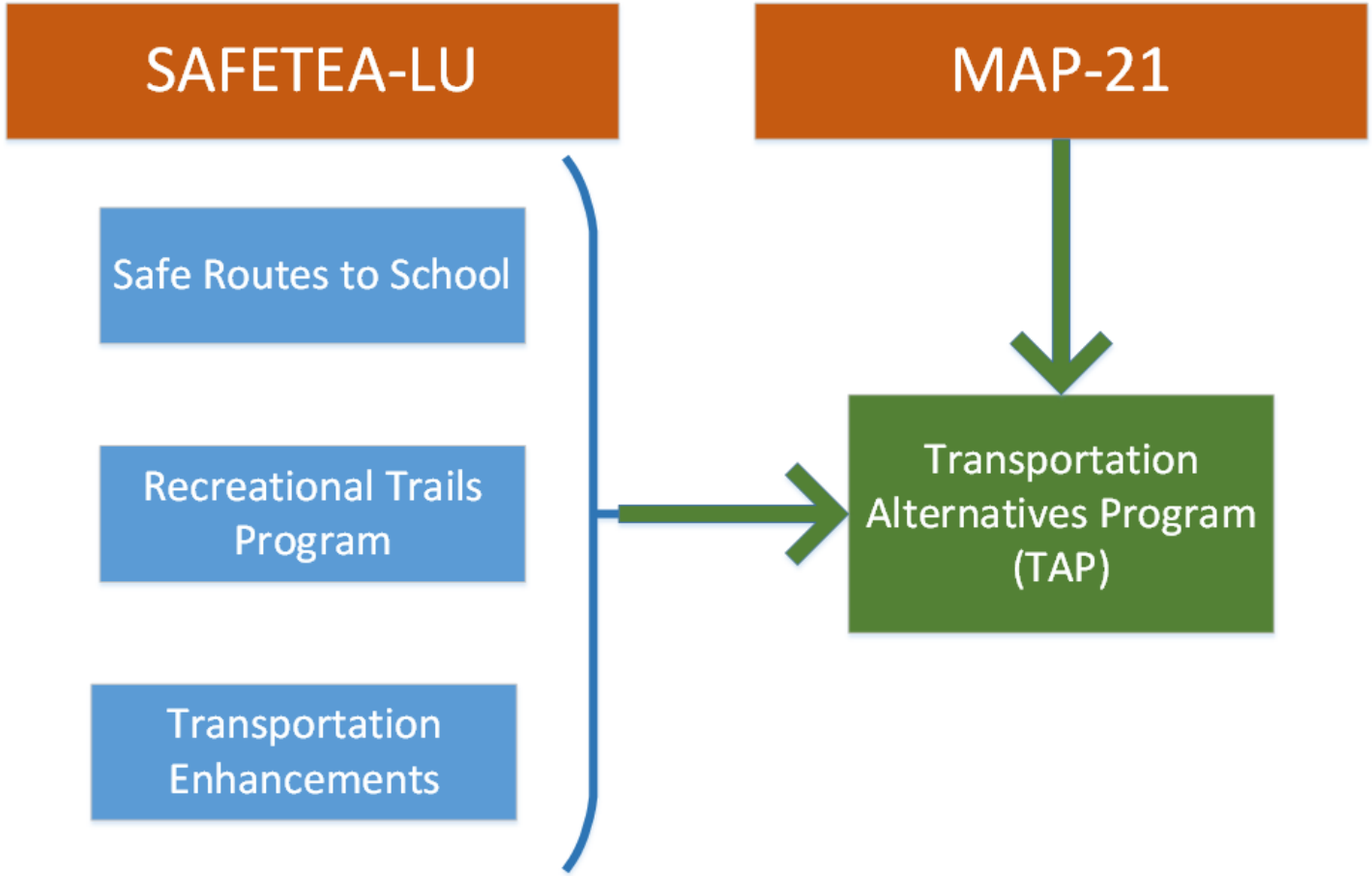
- Transportation Alternatives Program (TAP) overview
- MPO TAP Scoring Methodology
- Implement TAP methodology in GIS
- Results
- Conclusion


# Context: Federal Programs & the Greensboro MPO

- STP-DA
- CMAQ
- ARRA
- Transit
- **TAP**

Greensboro used suballocated funding over the last ten years to help implement over 59 miles of high need sidewalk, 12 intersection improvements, 16 miles of roadway widening projects, 115 buses, the $17.5 million Greensboro Transit Authority Maintenance and Administrative Facility, and renovated the multi-modal "Galyon Depot" in Downtown Greensboro.

# Transportation Alternatives Program (TAP) Overview

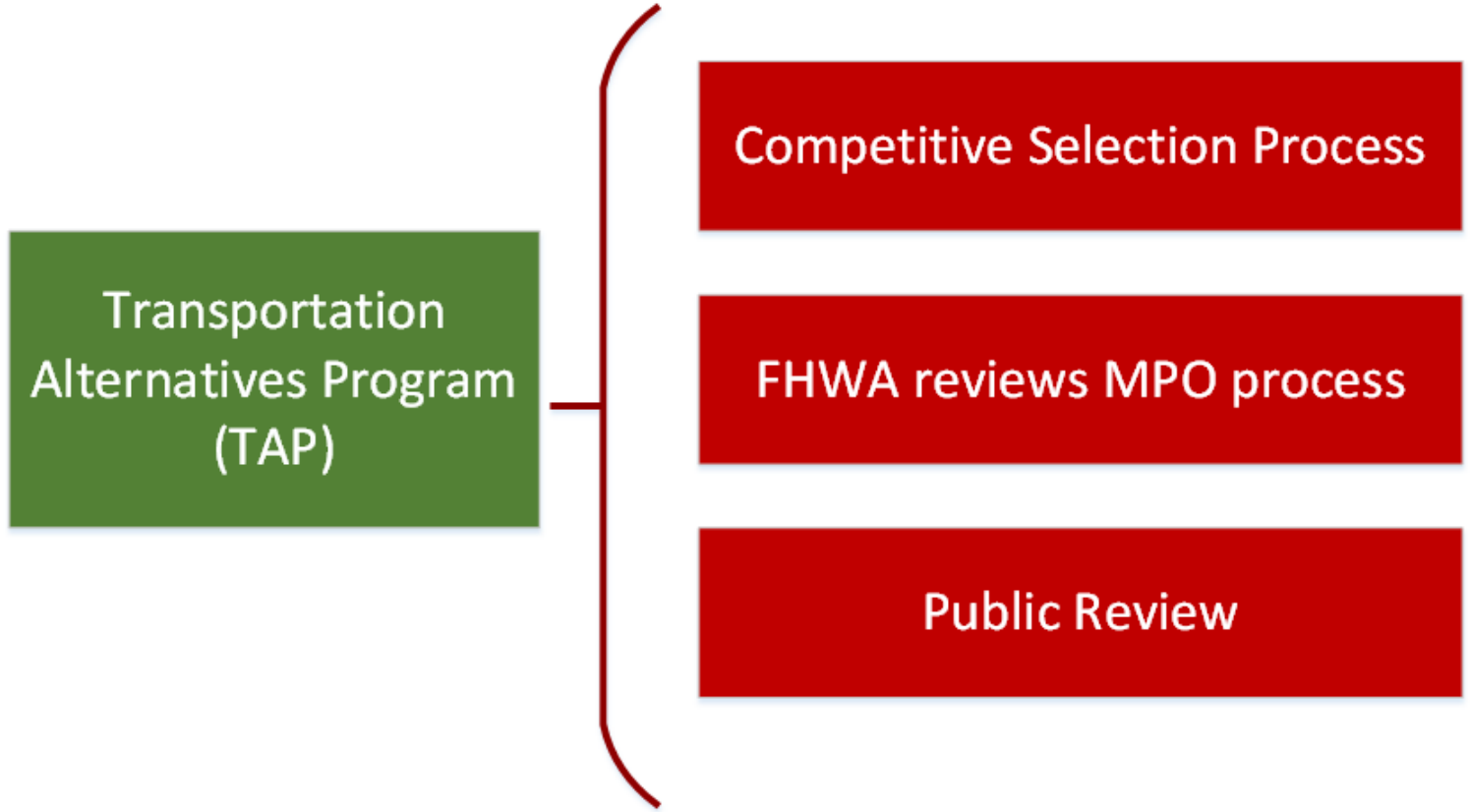


# TAP Overview: Funding Decision

**NCDOT** → Distributed through Prioritization

**TMA** → Sub allocated to large MPOs

# TAP Overview
# Selection Process Requirement



# TAP overview
# Project Requirement

Transportation Alternatives Program (TAP)

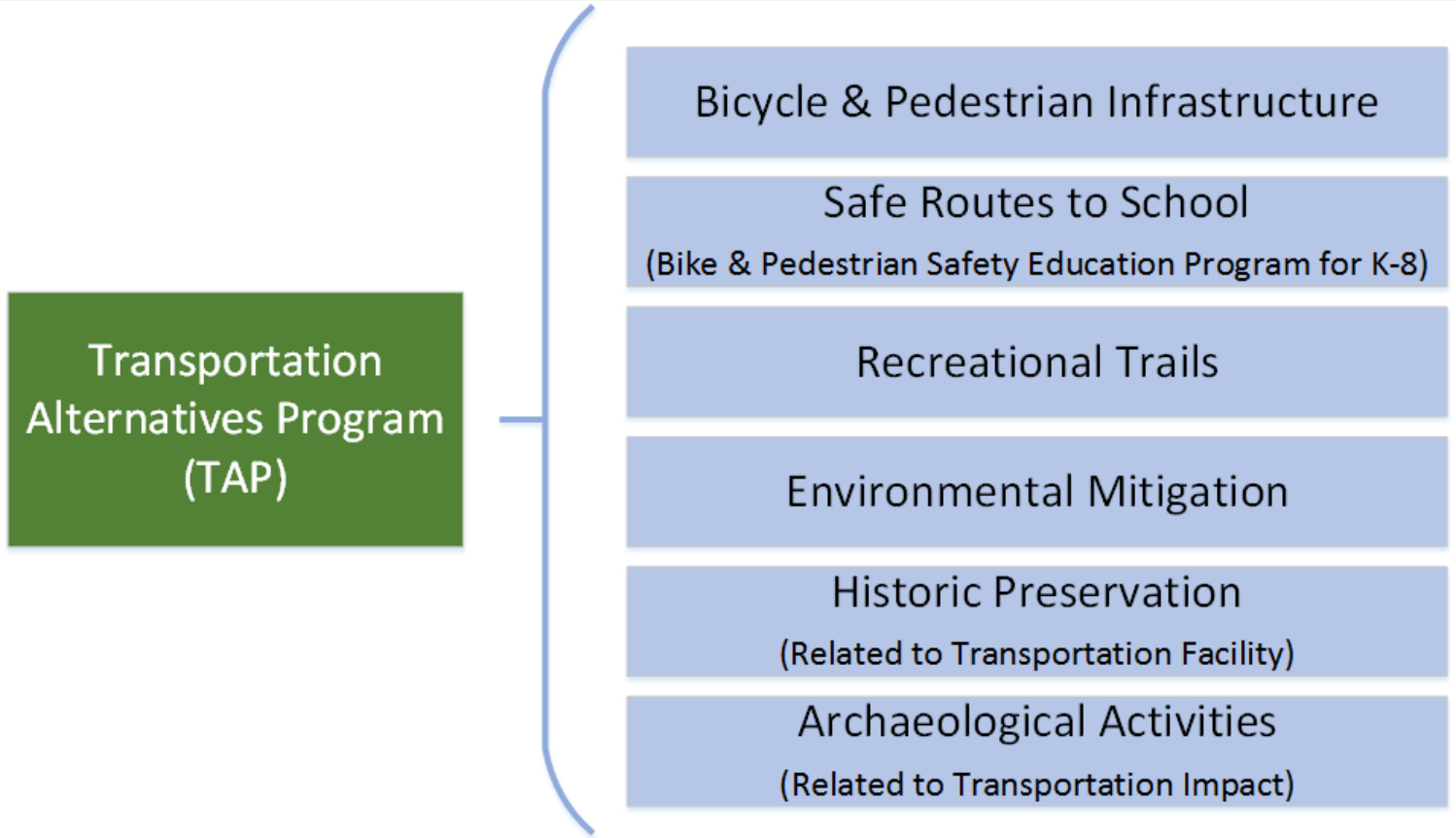
Implementable within the FY2014/2015

Local match 20%

Eligible Sponsors:

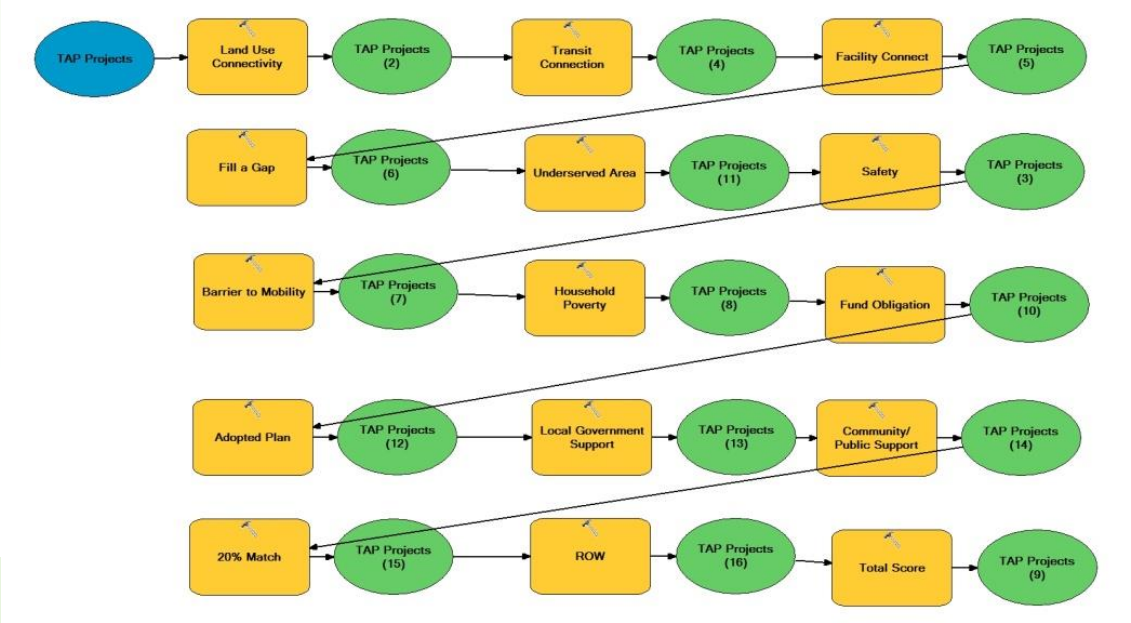
- Local governments
- Transit Agencies
- National Park Agency
- Guilford County Schools

# TAP Overview
# Eligible Projects



# How we approach TAP

- Systematic & GIS based
- Assess large number of potential projects
- Conceptual model derived from literature  and field experience
- Testing scenarios & validation

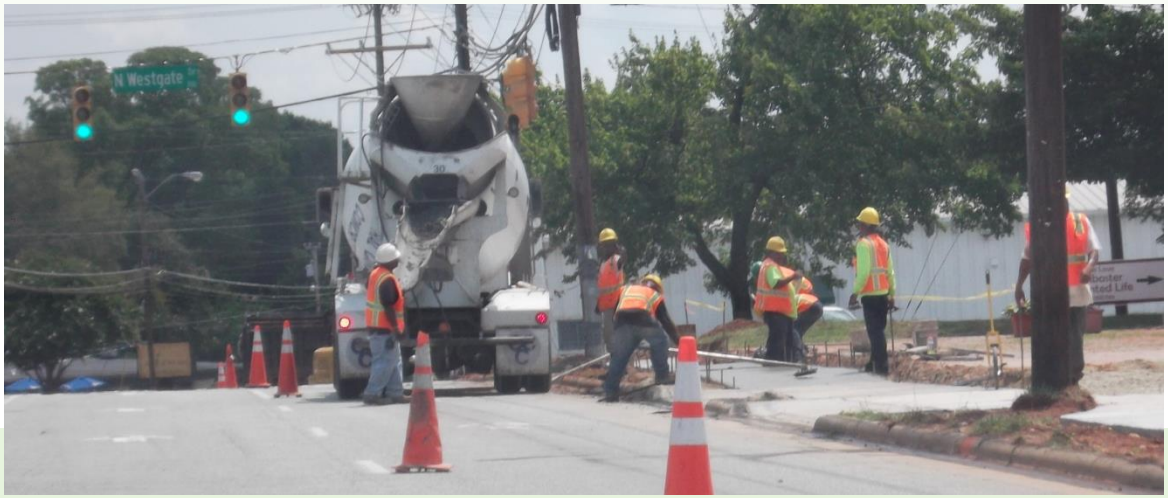


# TAP SCORING METHODOLOGY

MPO determined to consider 3 project types:

1. Bicycle Infrastructure
2. Pedestrian Infrastructure
3. Intersection Improvement

MPO put an emphasis on short term construction



# TAP SCORING METHODOLOGY

Four criteria:

1. Land Use Connectivity
2. Transportation System Connectivity
3. Safety & Mobility
4. Project Readiness & Viability

# 1. Land Use Connectivity

- Residential Area
- Employment/ Retail Center
- School
- Park or Recreation Center

# 2. Transportation System Connectivity

- Connect to transit service
- Connect to other transportation modes and/or facilities
- Connect to existing facility and fill a gap
- Is the project in an area underserved by bicycle & pedestrian infrastructure?
- Extend key parts of the regional greenway system (Bicentennial, Piedmont, A&Y, Downtown Greenway, Mountains to Sea Trail)

# 3. Safety & Mobility

- Safety problem
- Barrier to mobility
- Improve mobility for disadvantaged populations

# 4. Project Readiness & Viability

- Meet funds obligation requirements in the funding availability timeframe
- Part of an adopted plan
- Local government support
- Community/ public support
- Document source for the required 20% match
- ROW acquisition status

# GIS Model to Automate Calculation

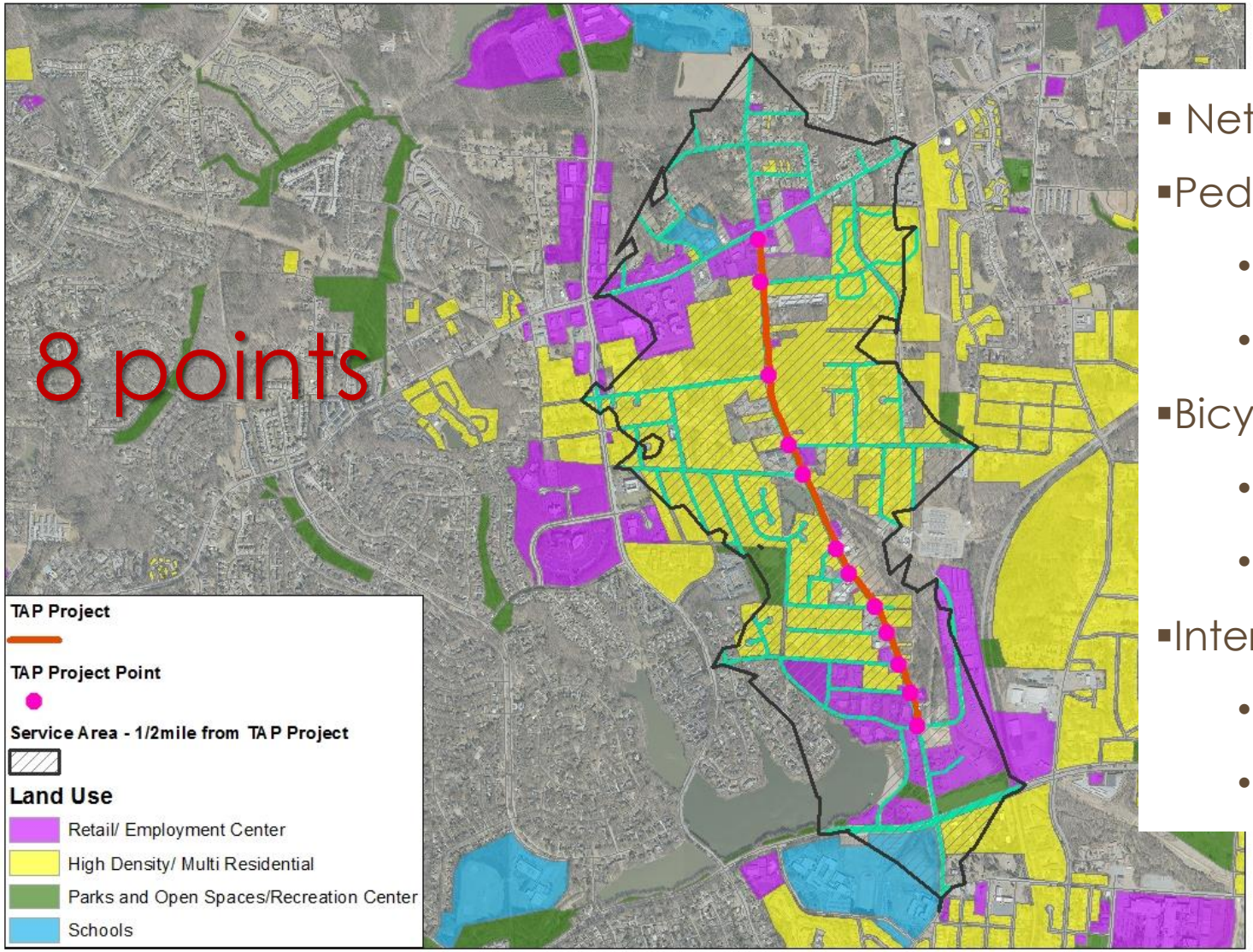
Land Use Connectivity

Transportation System Connectivity

Safety & Mobility

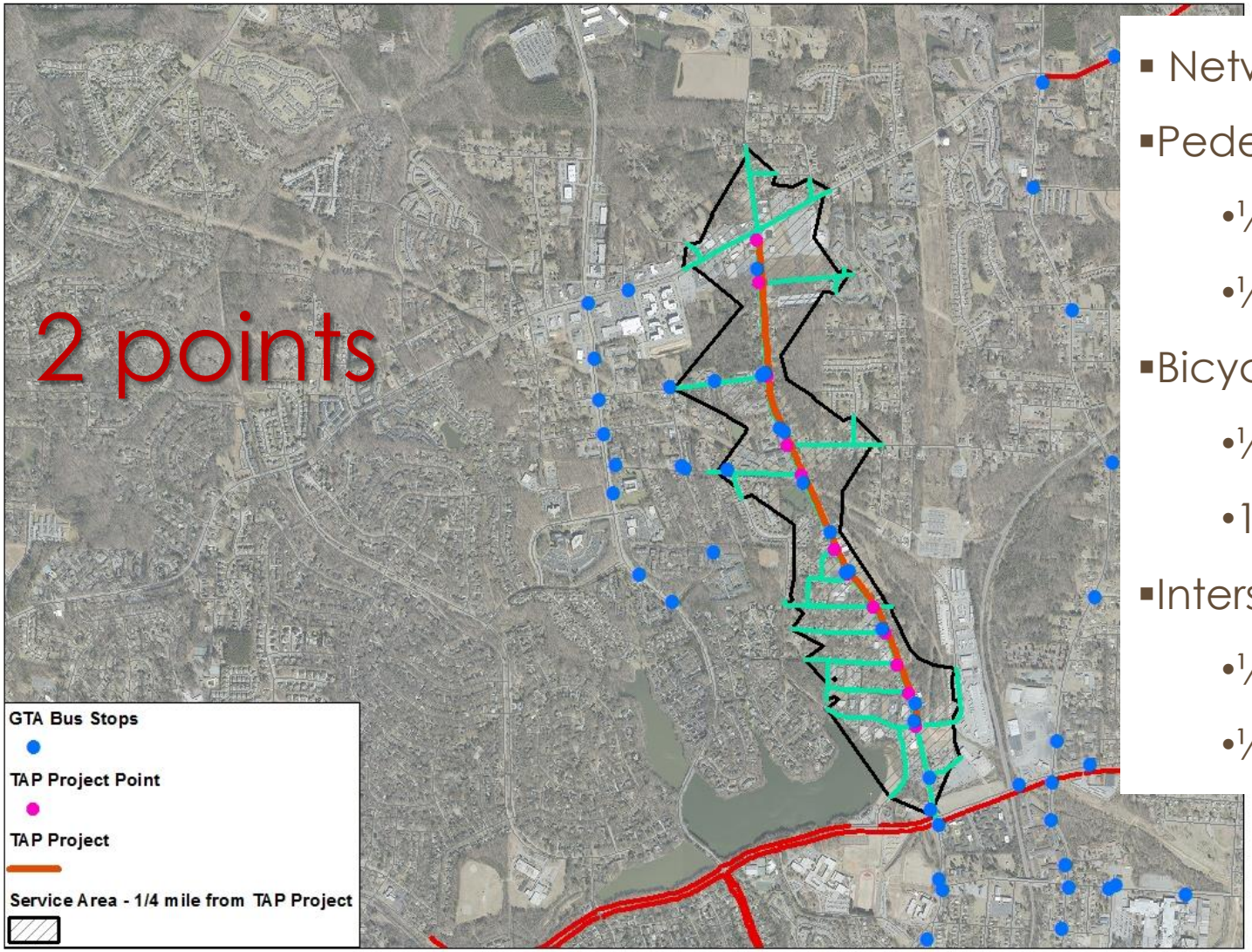
Project Readiness & Viability

# 1. Land Use Connectivity – 8 points



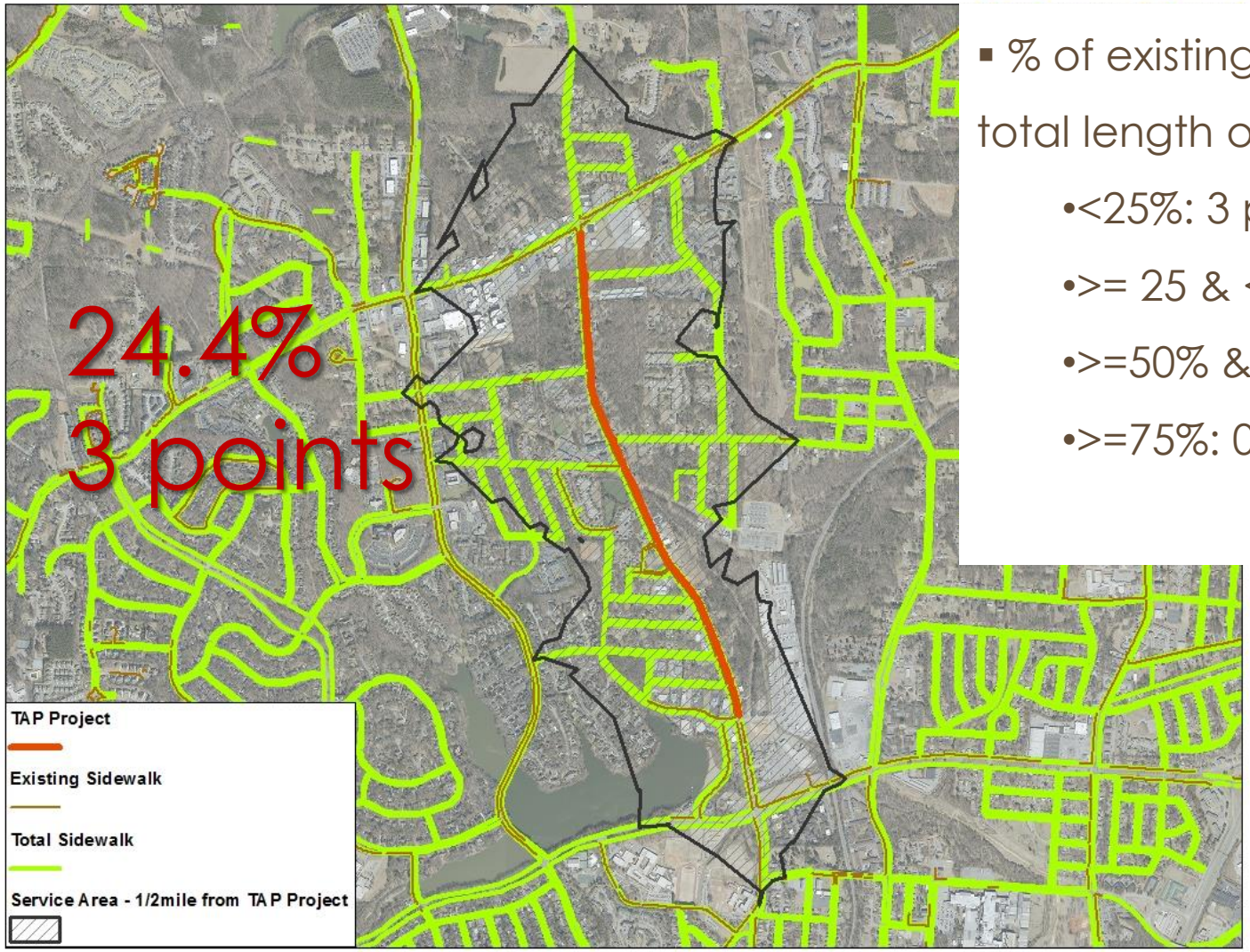

- Network Analyst
- Pedestrian projects:
  - ½ mile: 2 points
  - 1 mile: 1 point
- Bicycle projects:
  - 1 mile: 2 points
  - 1 ½ mile: 1 point
- Intersection projects:
  - ½ mile: 2 points
  - 1 mile: 1 point

# 2. Transportation System Connectivity - Transit Connection – 2 points



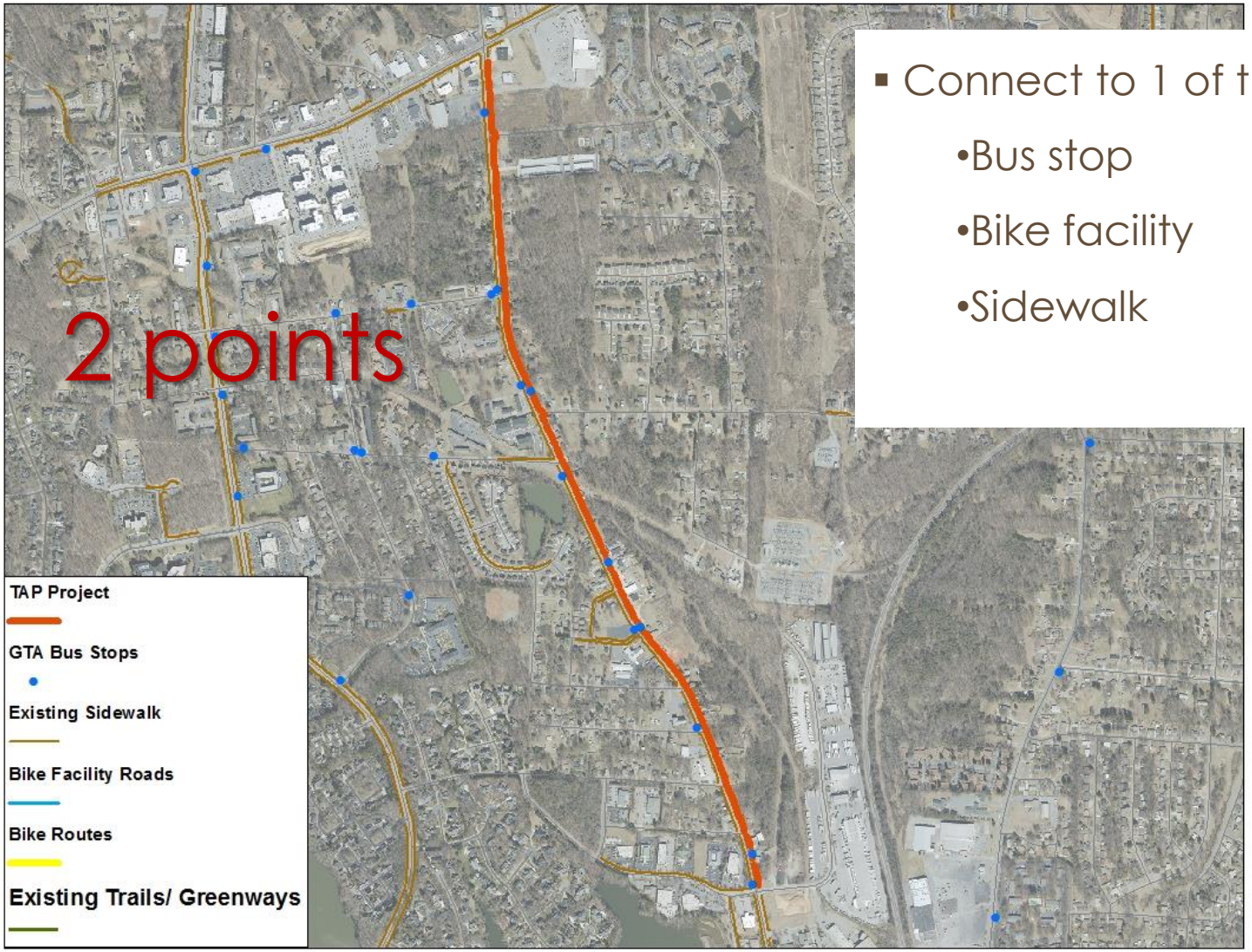

- Network Analyst
- Pedestrian projects:
  - ¼ mile: 2 points
  - ½ mile: 1 point
- Bicycle projects:
  - ½ mile: 2 points
  - 1 mile: 1 point
- Intersection projects:
  - ¼ mile: 2 points
  - ½ mile: 1 point

# 2. Transportation System Connectivity -
## In an area underserved Bike/Ped facility – 3 points



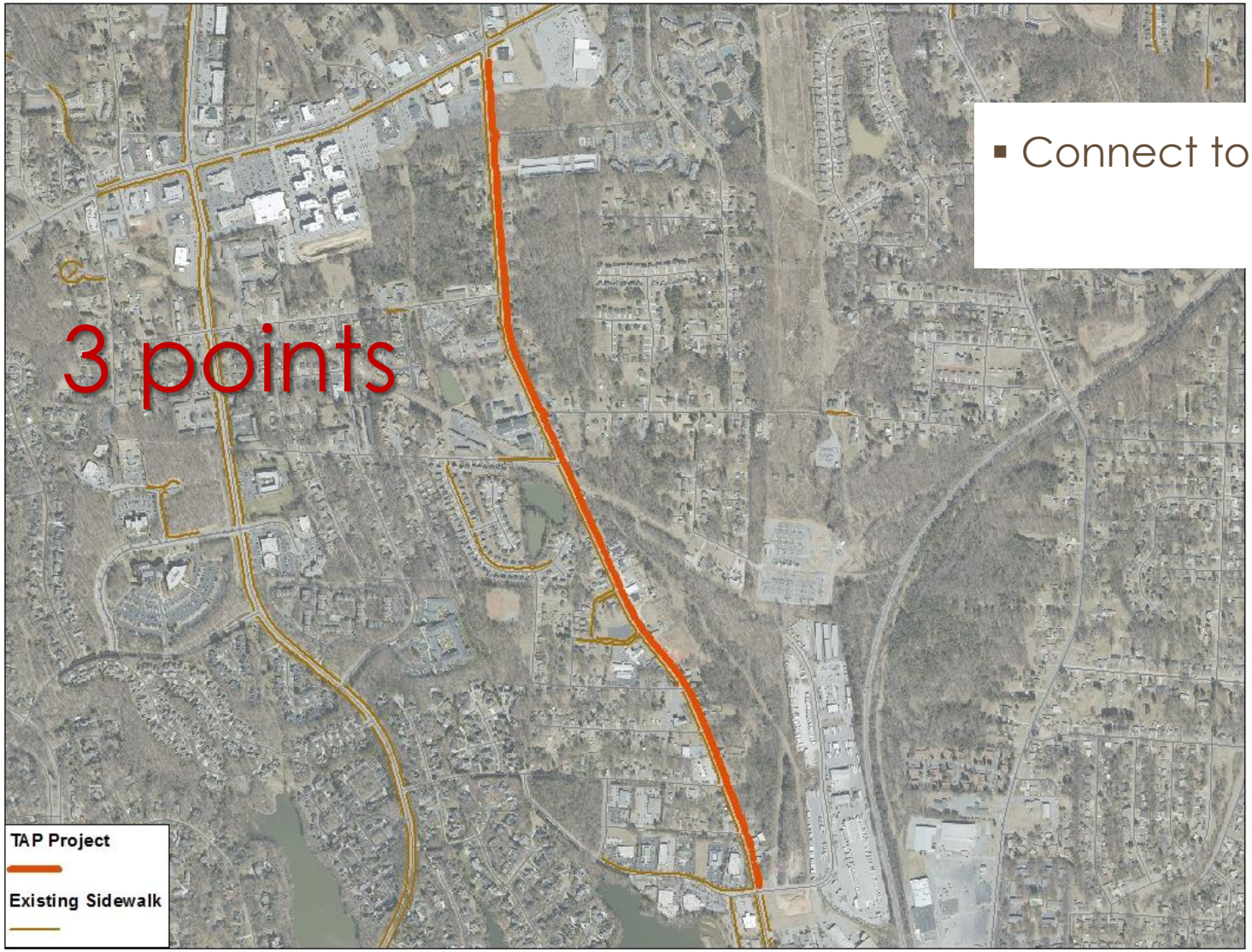

- % of existing sidewalk over total length of sidewalk
  - <25%: 3 points
  - >= 25 & <50%: 2 points
  - >=50% & <75%: 1 point
  - >=75%: 0 point

# 2. Transportation System Connectivity - Connect to other transportation modes/ facilities – 2 points




- Connect to 1 of these facilities:
  - Bus stop
  - Bike facility
  - Sidewalk

# 2. Transportation System Connectivity - Fill a gap – 3 points

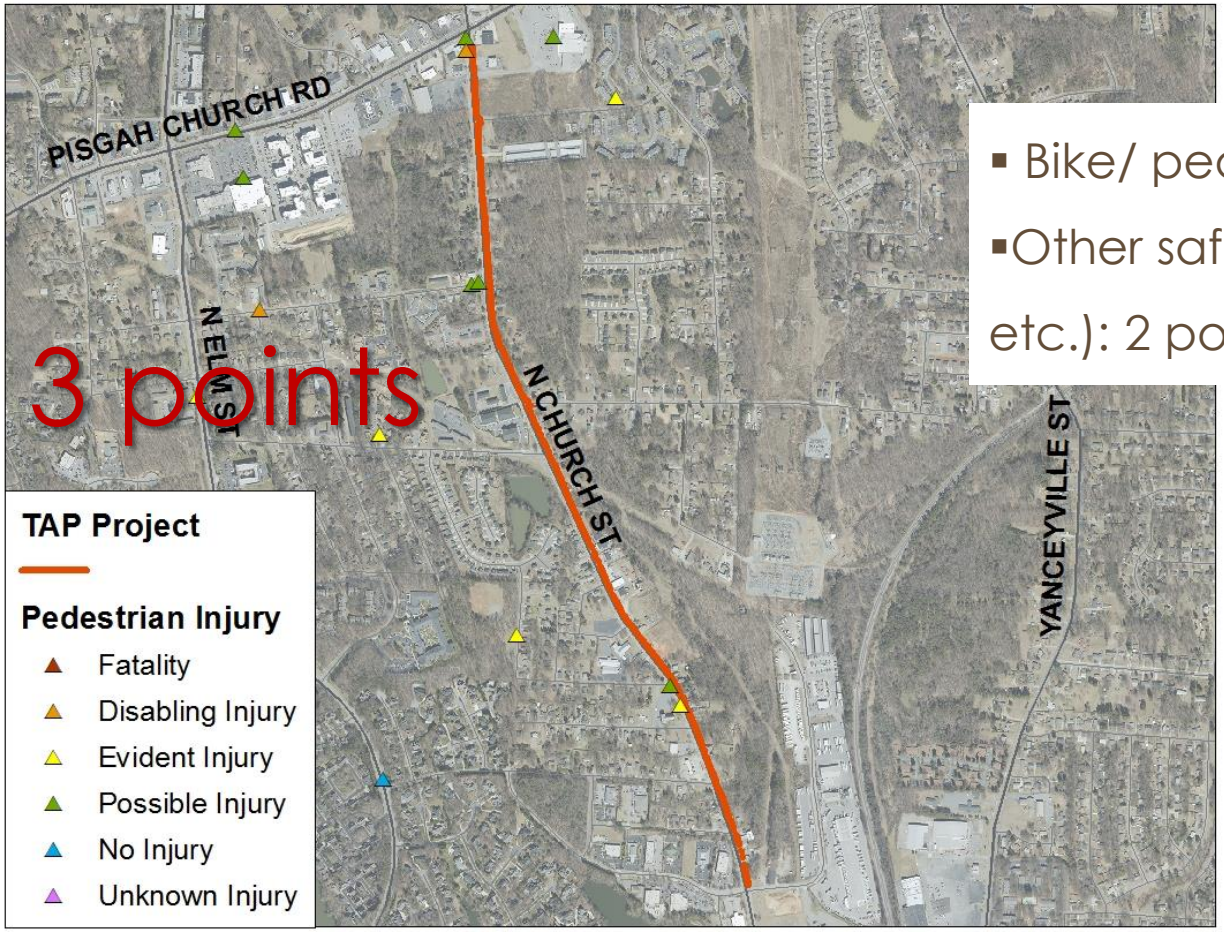



- Connect to same facility

# 2. Transportation System Connectivity - Extend key trails – 4 points

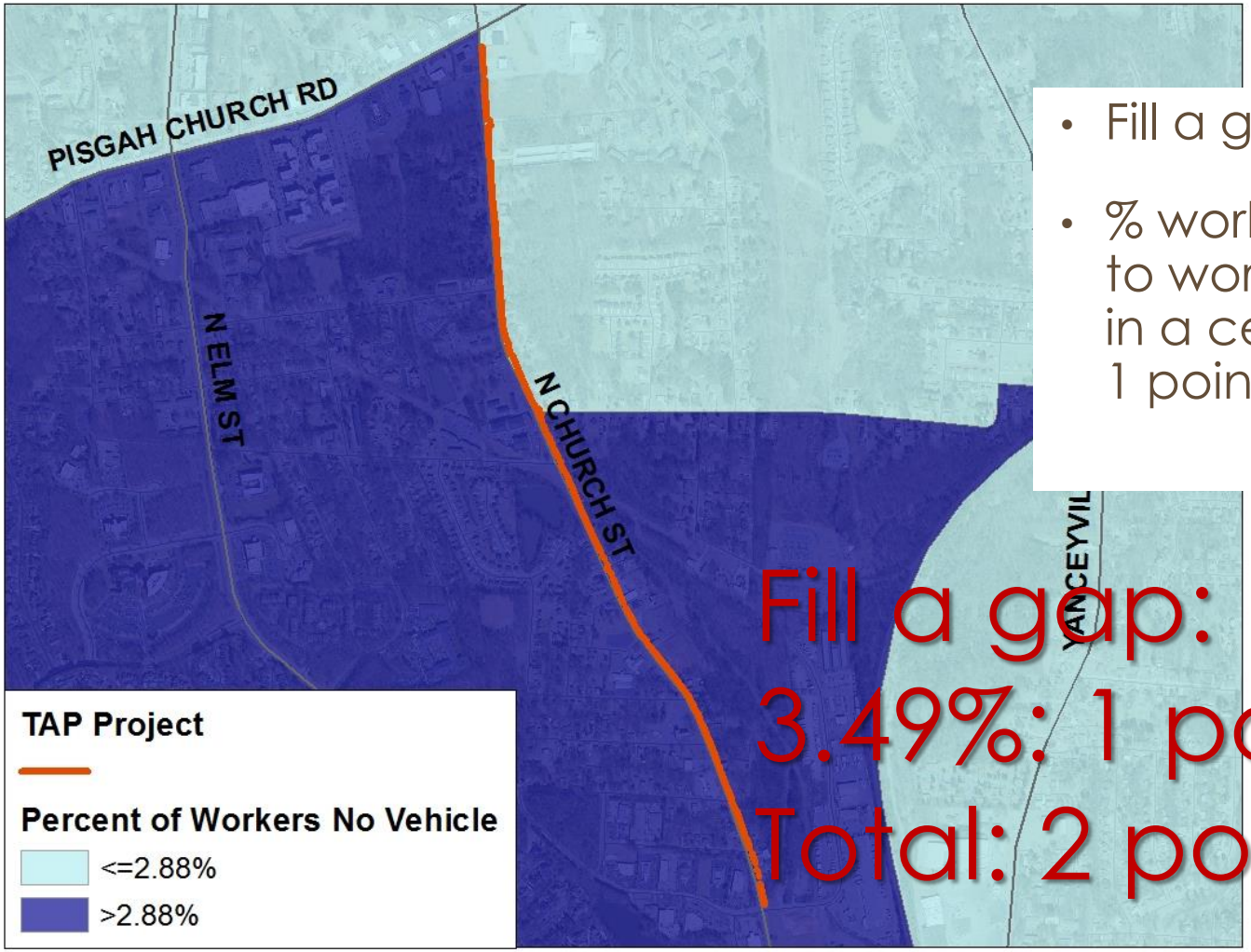
- Bicentennial
- Piedmont
- A&Y
- Downtown Greenway
- Mountains to Sea Trail

# 3. Safety & Mobility-
## Safety problem – 3 points




- Bike/ pedestrian crash: 3 points
- Other safety issues (crossing, light, etc.): 2 points

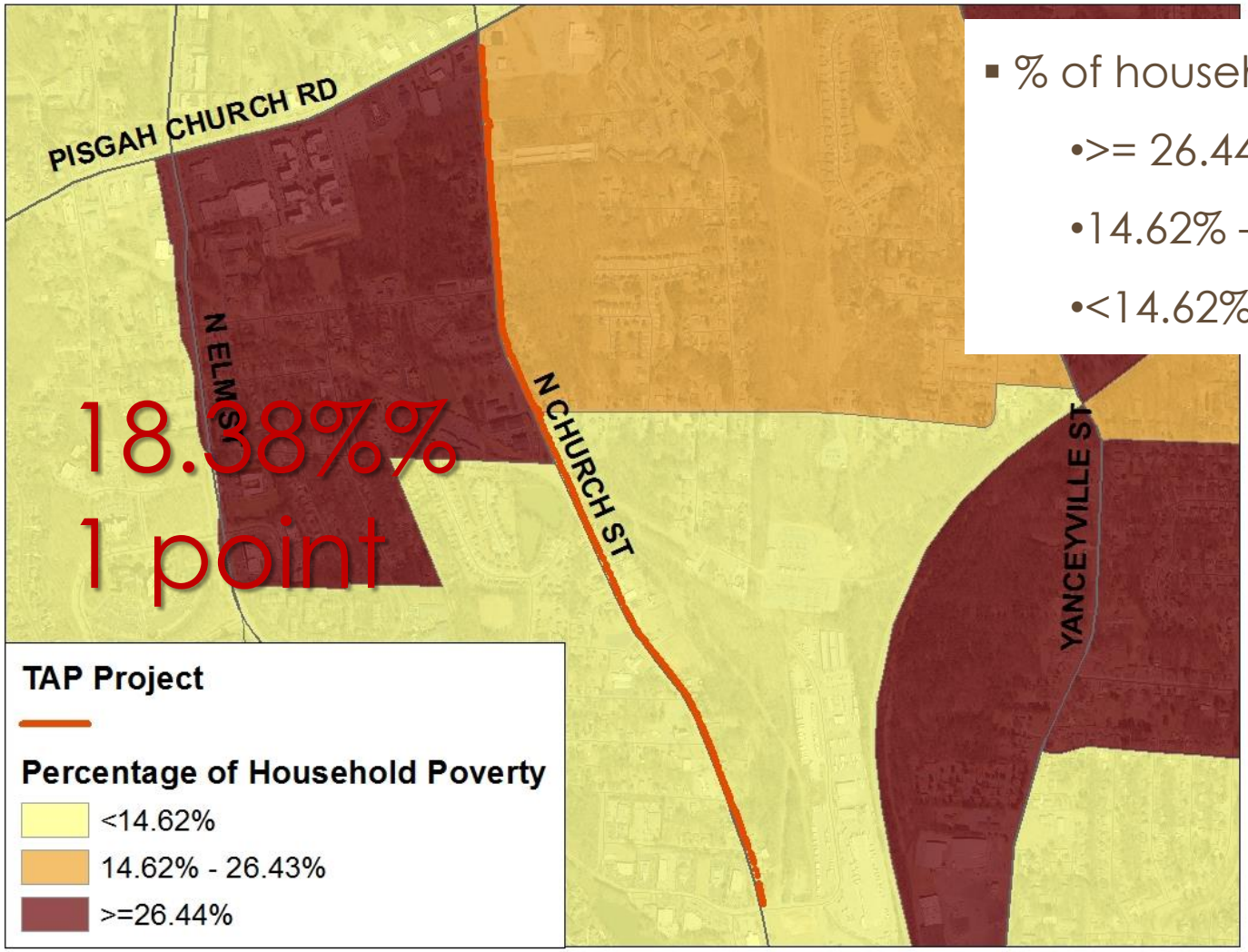
# 3. Safety & Mobility-
## Barrier to Mobility – 2 point




- Fill a gap: 1 point
- % worker with no vehicle to work (over total worker in a census tract) >2.88%: 1 point

Fill a gap: 1 point
3.49%: 1 point
Total: 2 points

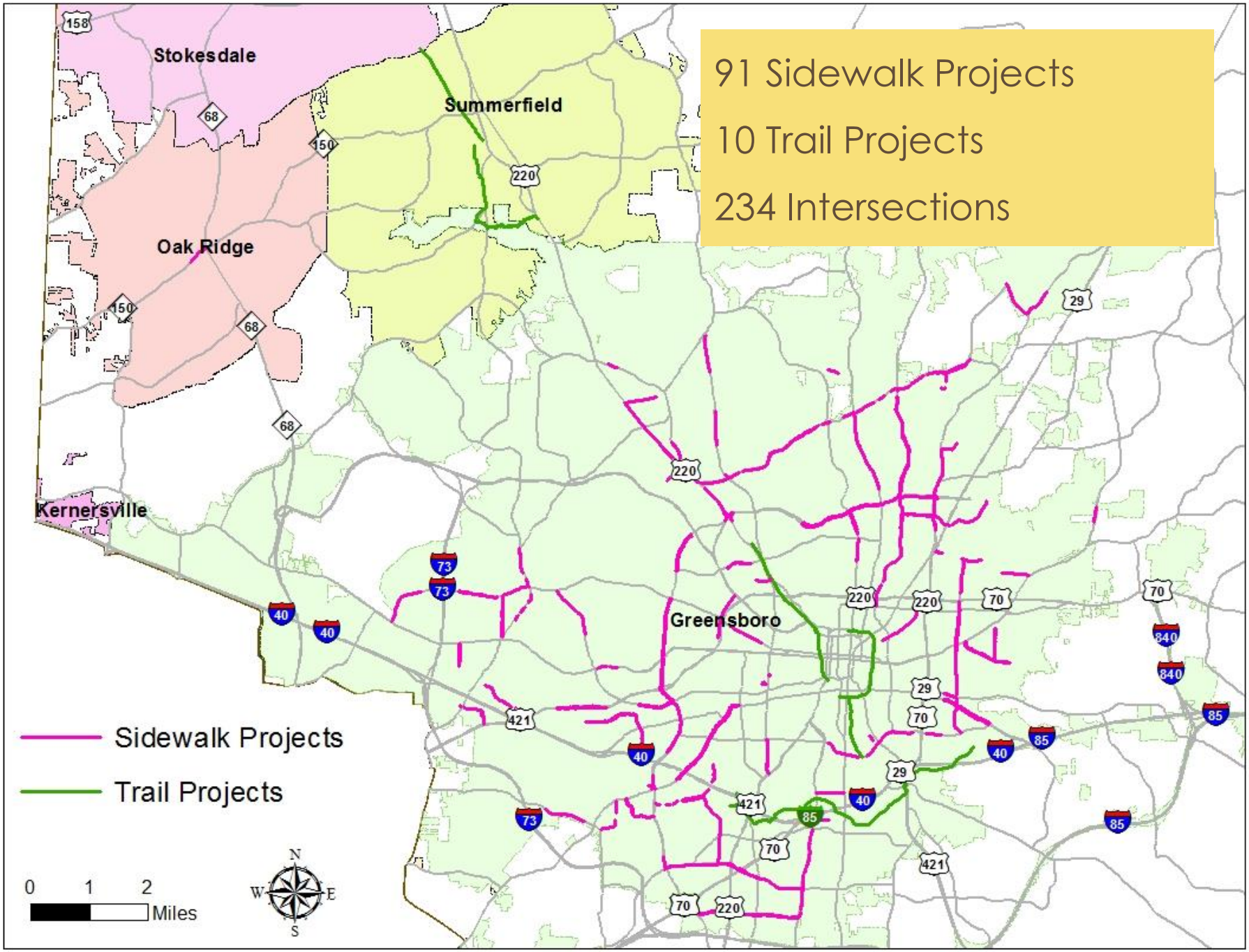
# 3. Safety & Mobility-
## Household Poverty – 2 points



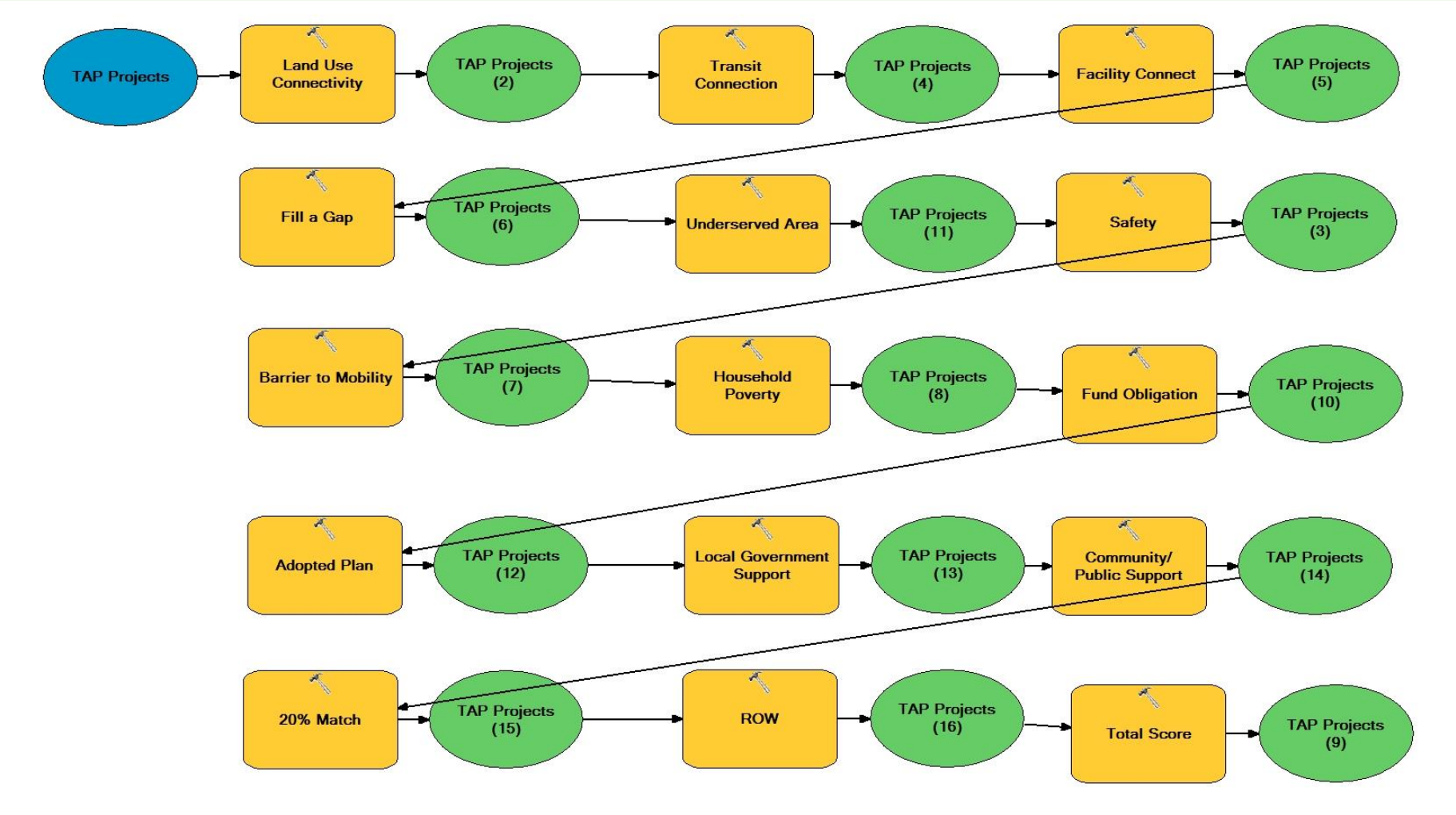

- % of household poverty:
  - >= 26.44%: 2 points
  - 14.62% – 26.44%: 1 point
  - <14.62%: 0 point

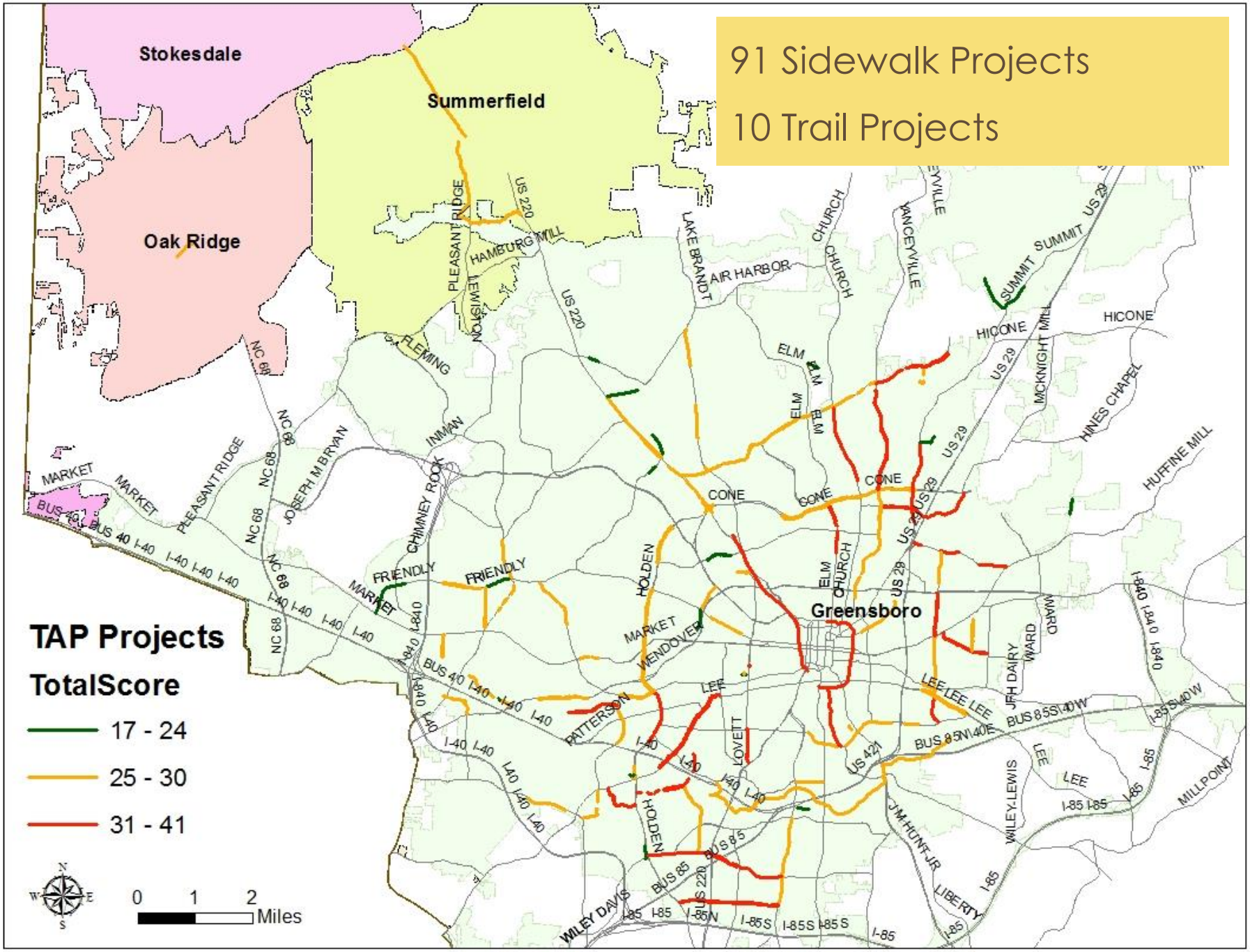
# 4. Project Readiness & Viability

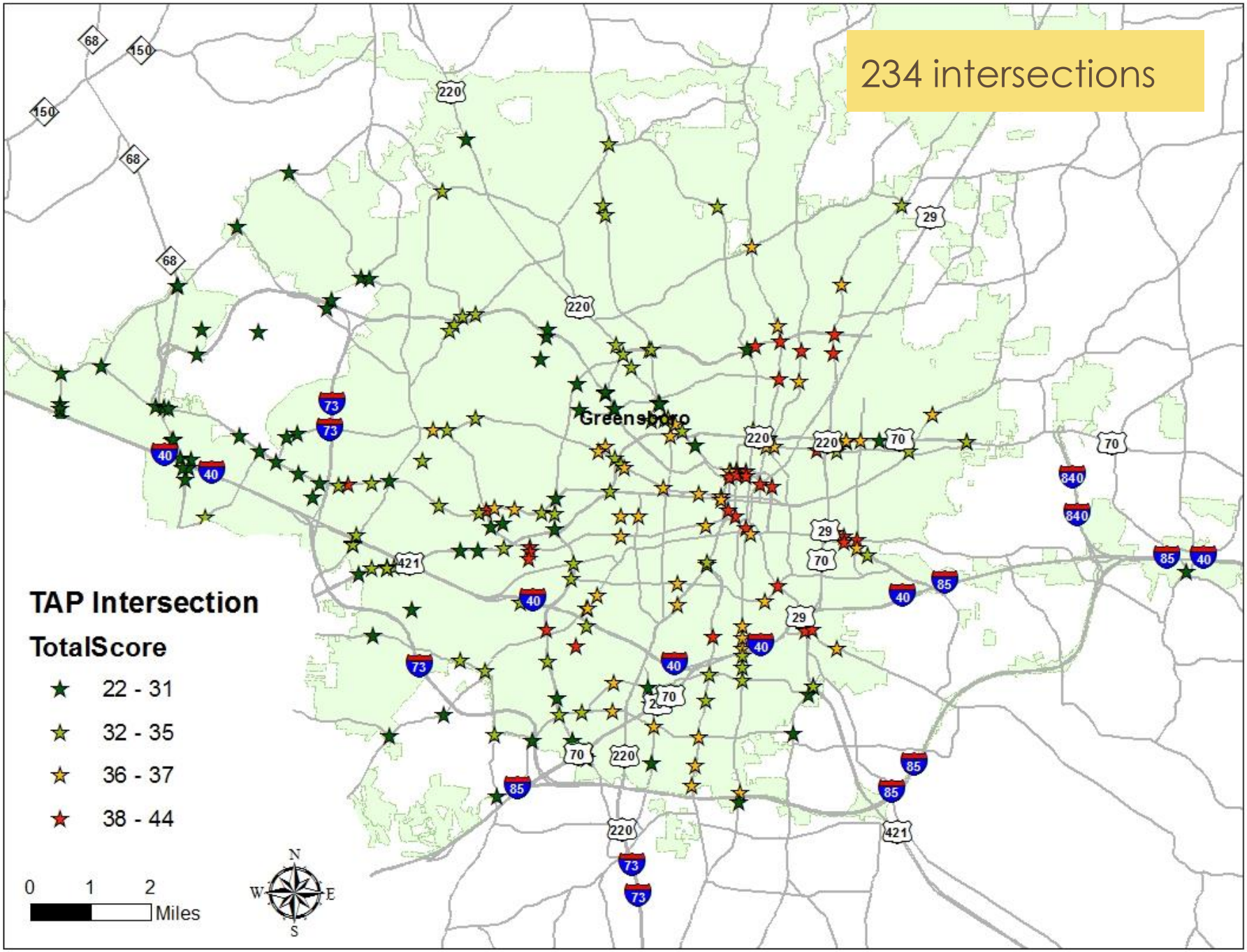
- Meet funds obligation requirements in the funding availability timeframe (4 points)
- Part of an adopted plan (2 points)
- Local government support (2 points)
- Community/ public support (2 points)
- Document source for the required 20% match (2 points)
- ROW acquisition status (2 points)


91 Sidewalk Projects
10 Trail Projects
234 Intersections
Stokesdale
Summerfield
Oak Ridge
Kernersville
Greensboro
Sidewalk Projects
Trail Projects
0 1 2
Miles
N
S
E
W

# GIS Model


TAP Projects
Land Use Connectivity
TAP Projects (2)
Transit Connection
TAP Projects (4)
Facility Connect
TAP Projects (5)
Fill a Gap
TAP Projects (6)
Underserved Area
TAP Projects (11)
Safety
TAP Projects (3)
Barrier to Mobility
TAP Projects (7)
Household Poverty
TAP Projects (8)
Fund Obligation
TAP Projects (10)
Adopted Plan
TAP Projects (12)
Local Government Support
TAP Projects (13)
Community/ Public Support
TAP Projects (14)
20% Match
TAP Projects (15)
ROW
TAP Projects (16)
Total Score
TAP Projects (9)


91 Sidewalk Projects
10 Trail Projects
Stokesdale
Summerfield
Oak Ridge
Greensboro
TAP Projects
TotalScore
17 - 24
25 - 30
31 - 41
0 1 2
Miles


234 intersections
Greensboro
TAP Intersection
TotalScore
22 - 31
32 - 35
36 - 37
38 - 44
0 1 2
Miles
N
W
E
S

# Results

| Map ID | Project | Description | Total Score | Estimated Cost | Land Use Connect | Transit Connect | Mode Type Connect | Mode Connect Score | Same Mode Connect Score | Percent of Existed Infrastructure | Infrastructure Score | Trail Connect | Safety | Barrier | Disadvantaged Score | Funds Obligation Score | Plan | Government Support | Community Support | Match | ROW acquired Score | Current Funding | Proposed Funding | Length (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 2a | 2b | 2b | 2c | 2d | 2d | 2e | 3a | 3b | 3c | 4a | 4b | 4c | 4d | 4e | 4f | | | |
| | Greensboro Pedestrian Signals | Install or upgrade the pedestrian signals | 38* | $350,000.00 | | | | | | | | | | | | | | | | | | None | TAP | |
| 21 | Phillips Avenue | Where none exists between Summit Ave and Huffine Mill Rd | 34 | $330,000.00 | 8 | 2 | Sidewalk | 2 | 3 | 18.28% | 3 | 0 | 3 | 2 | 1 | 4 | 2 | 2 | 0 | 2 | 0 | CMAQ | TAP | 5,150.34 |
| 65 | Aycock Street | Intersection improvement at Aycock Street and Walker Avenue | 33 | $173,000.00 | 8 | 2 | Sidewalk | 2 | 3 | 71.00% | 1 | 0 | 3 | 2 | 2 | 0 | 2 | 2 | 2 | 2 | 2 | None | TAP | 211.85 |
| 57 | Summit Ave | West side 16th St to existing and east side from Rankin Rd to Avery driveway | 33 | $300,000.00 | 8 | 2 | Sidewalk | 2 | 3 | 11.47% | 3 | 0 | 3 | 2 | 1 | 3 | 2 | 2 | 0 | 2 | 0 | STPDA | STPDA | 7,025.04 |
| 68 | Hewitt Street | Norwalk St to Merritt Dr | 33 | $310,000.00 | 8 | 2 | Sidewalk | 2 | 3 | 12.41% | 3 | 0 | 3 | 2 | 1 | 3 | 2 | 2 | 0 | 2 | 0 | STPDA | STPDA | 7,674.73 |
| 69 | Lees Chapel Road | Yanceyville St to Brightwood School Rd | 33 | $350,000.00 | 8 | 2 | Sidewalk | 2 | 3 | 23.15% | 3 | 0 | 3 | 2 | 1 | 3 | 2 | 2 | 0 | 2 | 0 | CMAQ | CMAQ | 9,775.48 |
| 41 | Church Street | Lees Chapel Road to Electra Drive (east side only) Replace wheelchair ramps on west | 32 | $280,000.00 | 8 | 2 | Sidewalk | 2 | 3 | 24.33% | 3 | 0 | 3 | 2 | 1 | 2 | 2 | 2 | 0 | 2 | 0 | CMAQ | CMAQ | 6,431.54 |

# Project: Greensboro Pedestrian Signals

- Description:  Install or upgrade the pedestrian signals
- Cost: $350,000
- Total Score: 38
- Current Funding: None
- Proposed Funding: TAP

# Project 21: Phillips Ave

- Description: Where none exists between Summit Ave and Huffine Mill Rd
- Cost: $330,000
- Total Score: 34

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Land Use Connect** | 8 | **Percent of Existed Infrastructure** | 18.28% | **Disadvantaged Score** | 1 | **Match** | 2 |
| **Transit Connect** | 2 | **Infrastructure Score** | 3 | **Funds Obligation Score** | 4 | **ROW acquired Score** | 0 |
| **Mode Type Connect** | Sidewalk | **Trail Connect** | 0 | **Plan** | 2 | **Current Funding** | CMAQ |
| **Mode Connect Score** | 2 | **Safety** | 3 | **Government Support** | 2 | **Proposed Funding** | TAP |
| **Same Mode Connect Score** | 3 | **Barrier** | 2 | **Community Support** | 0 | **Length (ft)** | 5,150.34 |

# Project 65: Aycock St

Cost: $173,000.00 Total Score: 33


| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Land Use Connect** | 8 | **Percent of Existed Infrastructure** | 71.00% | **Disadvantaged Score** | 2 | **Match** | 2 |
| **Transit Connect** | 2 | **Infrastructure Score** | 1 | **Funds Obligation Score** | 0 | **ROW acquired Score** | 2 |
| **Mode Type Connect** | Sidewalk | **Trail Connect** | 0 | **Plan** | 2 | **Current Funding** | None |
| **Mode Connect Score** | 2 | **Safety** | 3 | **Government Support** | 2 | **Proposed Funding** | TAP |
| **Same Mode Connect Score** | 3 | **Barrier** | 2 | **Community Support** | 2 | **Length (ft)** | 211.85 |

# Conclusion

- GIS models can be effective
- Conceptual underpinnings are key
- Validation is important
- This approach is consistent with the performance planning requirements of MAP-21 and good planning practice
- TAP process is somewhat time consuming but worthwhile
  - Effective way to distribute limited resources
  - Good practice for future requirements

# THANK YOU!

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