Stacey N. Glass
State Traffic Engineer
Alabama Department of Transportation

2012 NRITS Conference/Gulf Region ITS Meeting

September 16 – 19, 2012

Biloxi, MS

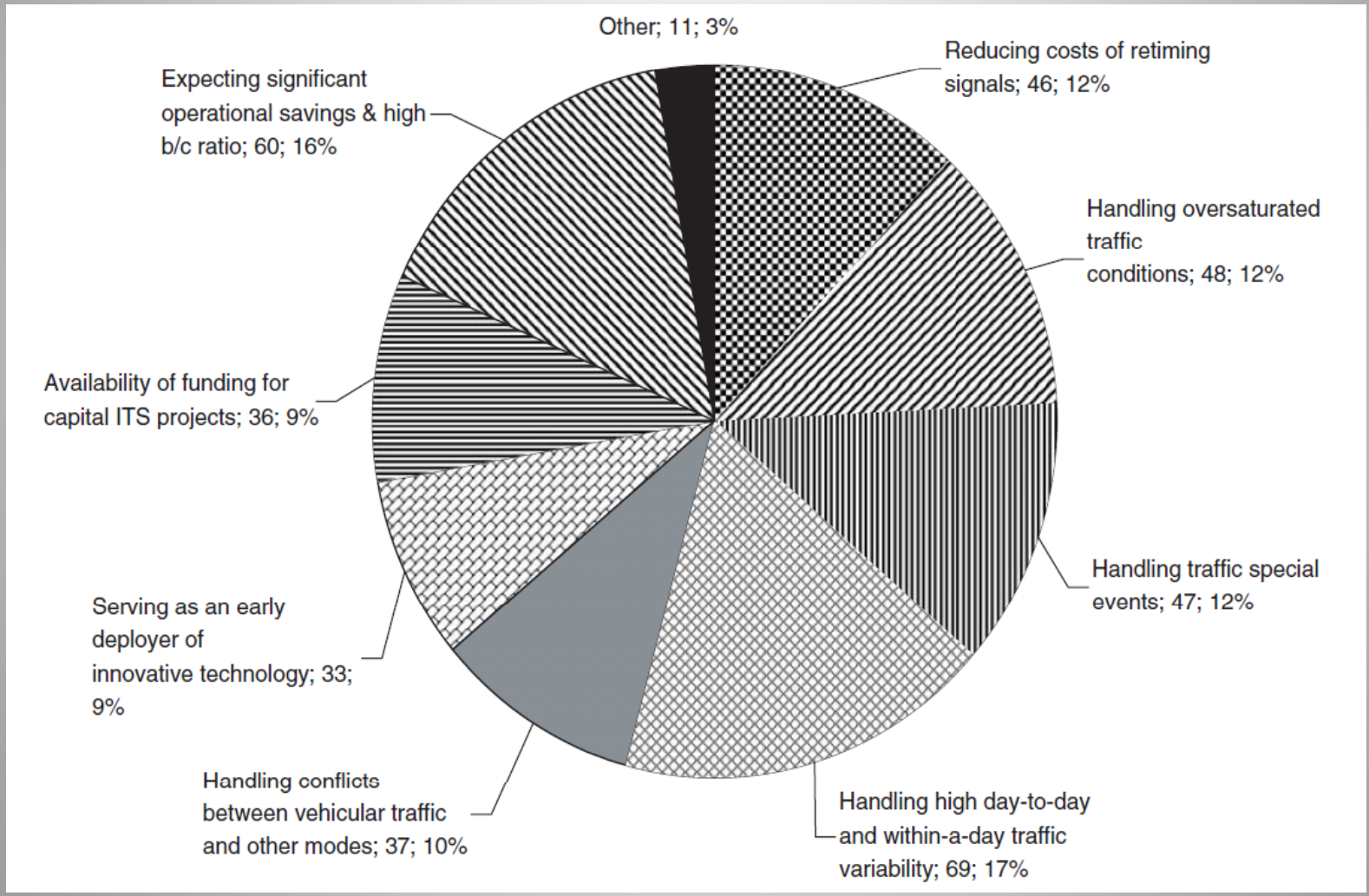
Adaptive Traffic Signal Control
The Alabama Experience

- First introduced to ITS Advisory Committee (2010)
- FHWA's Every Day Counts Summit (12/2010)
- FHWA Scan Tours in Georgia (9/2011)
- 3 Pilot Project Sites Selected (11/2011)
  - Montgomery, AL
  - Birmingham, AL
  - Huntsville, AL
- Completion Deadline of June 2012
- SCATS Selected as Adaptive System (FHWA Approval Experimental Projects)

Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Existing Communications Network
  - Existing Equipment Compatible with SCATS
  - Vehicle Detection Technology
  - AADT and LOS
  - Route Types

Major reasons for implementing an ATCS (NCHRP SYNTHESIS 403)



Sydney Coordinated Adaptive Traffic System (SCATS)

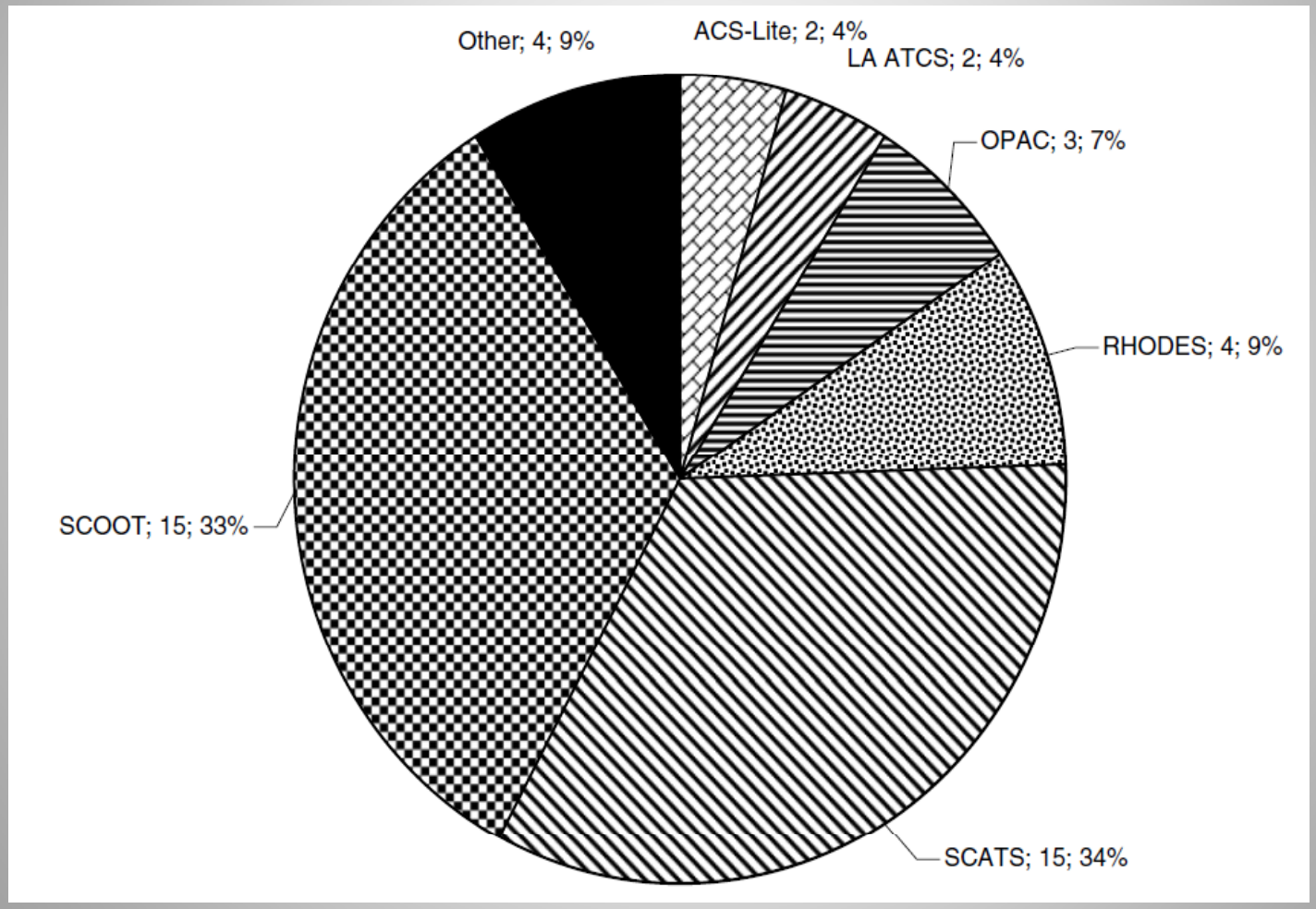
SCATS - widely used adaptive traffic control systems

- 30,000+ intersections globally, 1,000+ intersections in the US

SCATS Capabilities

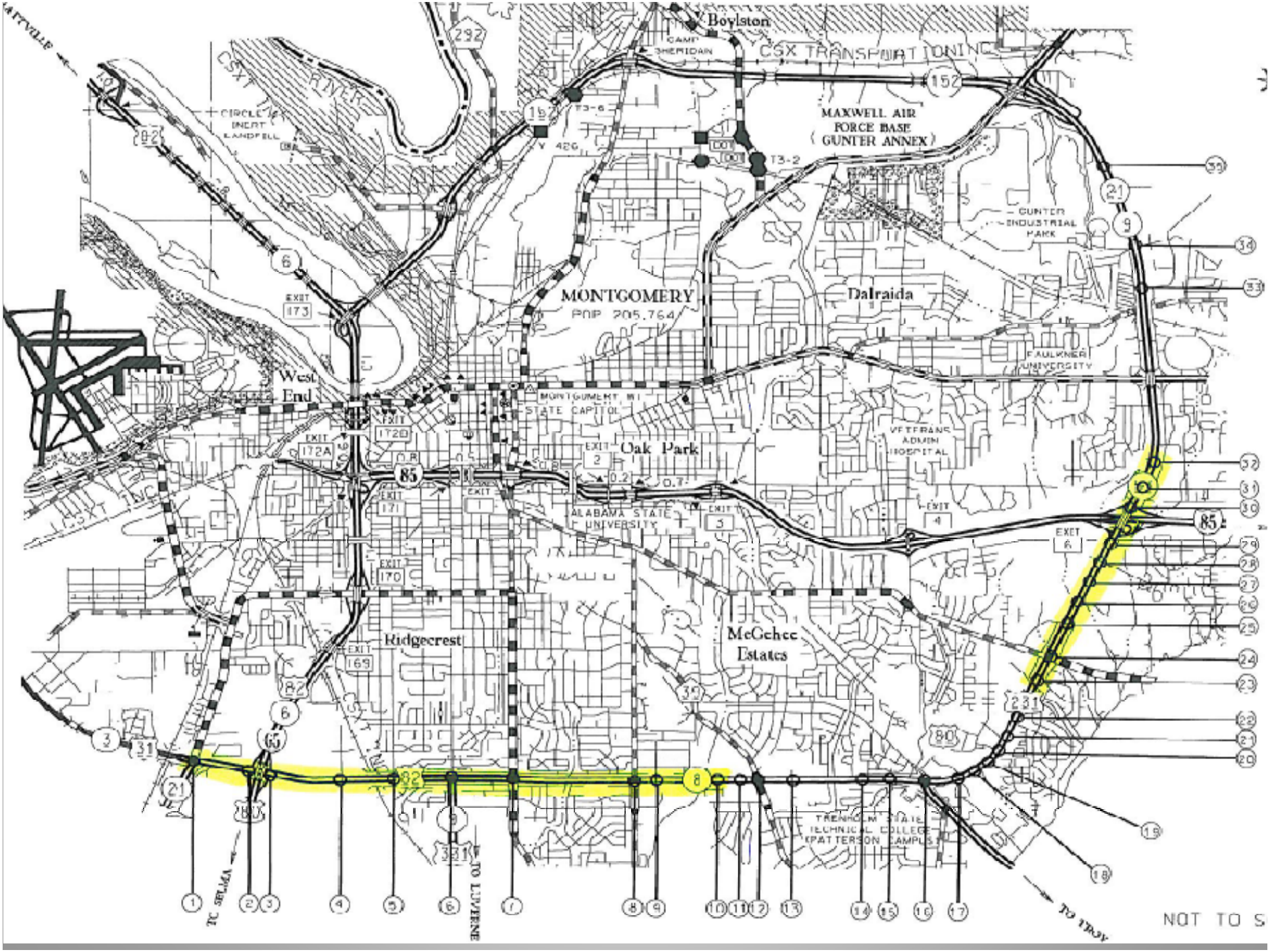
- SCATS has an open architecture for communications, controllers and detection. This allows a city to utilize various manufacturers' equipment. SCATS specific capabilities include:
- True real-time, cycle-by-cycle 100 percent adaptive control capabilities;
- Capable of being easily expanded;
- Operates in adaptive mode 24/7, 365 days a year without manual intervention;
- Provides real-time and historical detection monitoring and alarm features;
- Has been field integrated with Ethernet IP communications;
- Capable of identifying system malfunctions and abnormalities and generate alarms for operators or maintenance personnel;
- Automatically records timing and detection information for 365 days for historical analysis;
- Provides pre-emption and transit priority features

Market shares of various ATCSs (NCHRP SYNTHESIS 403)



SCATS Montgomery, AL

- Project Location – East/South Bypass
  - US 31 (Mobile Hwy) to Roy Hodges Blvd.
- Project Details
  - Designed In House
  - 35 Intersections
  - 12.6 Miles
  - City of Montgomery Maintenance Responsibility
- Project Cost
  - $1.8 Million
  - Contract Awarded to World Fiber (April 2012 Letting)
  - November 16, 2012 (Completion Date)


Boylston
CAMP SHERIDAN
CSX TRANSPORTATION INC
CSX
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MAXWELL AIR FORCE BASE (GUNTER ANNEX)
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Dalraida
West End
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FAULKNER UNIVERSITY
VETERANS ADMIN HOSPITAL
Oak Park
ALABAMA STATE UNIVERSITY
Ridgecrest
McGehee Estates
TRENHOLM STATE TECHNICAL COLLEGE (PATTERSON CAMPUS)
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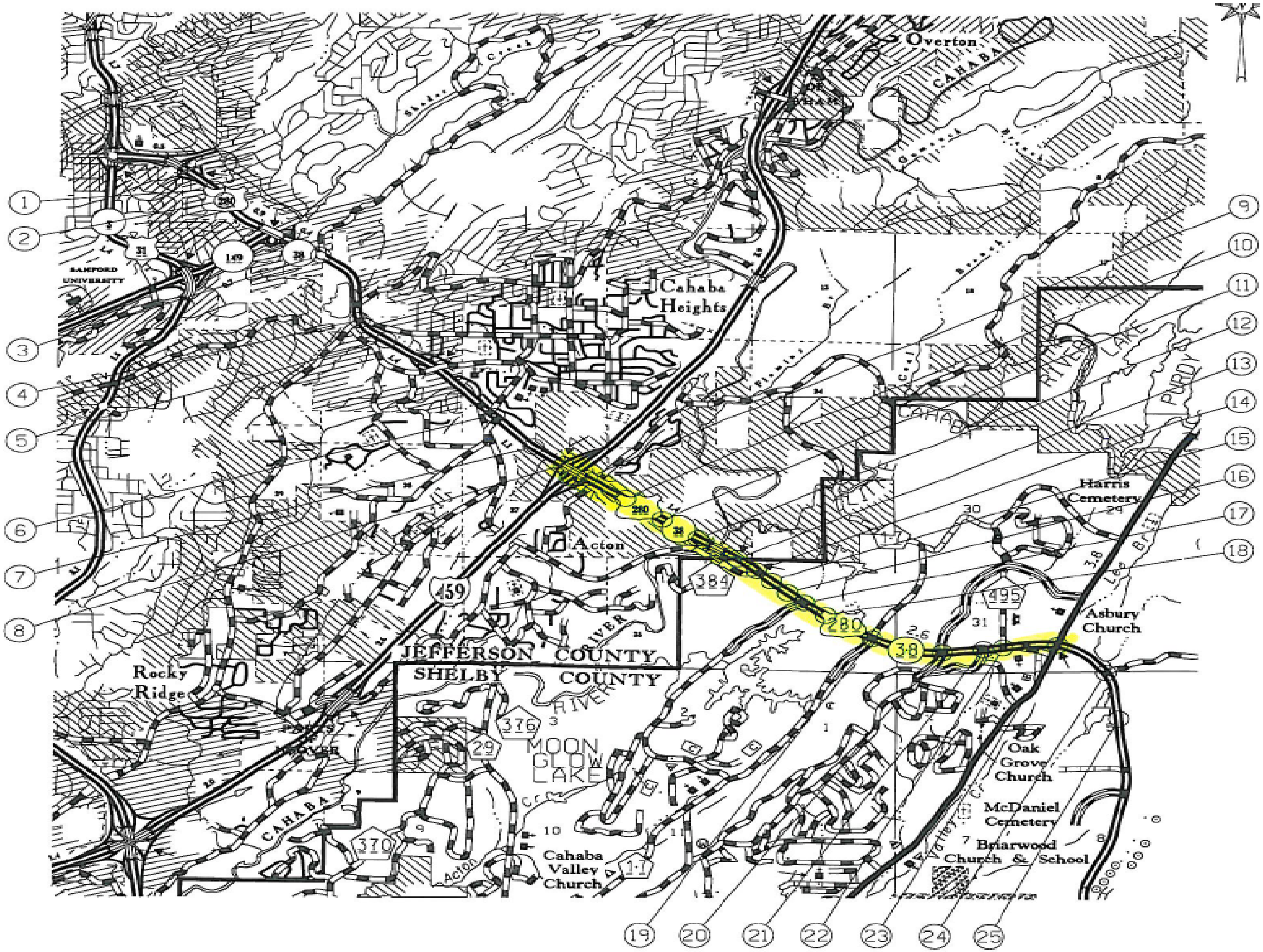
SCATS Montgomery, AL

- AADT Along Bypass – 30,000 to 60,000
  - Mostly Commuter Traffic
  - Heavy AM/Noon/PM Peak Periods
  - Variability During Events (Incidents/Evacuations)
    - Direct Access to I-85 and I-65
  - Existing Closed Loop System (TACTICS)
- Project Details
  - Utilize Existing M-52 Controllers
  - Utilize Existing Fiber Along Entire Corridor
  - New Video Detection Cameras Along Entire Corridor

SCATS Birmingham, AL

- Project Location – US 280
  - Brook Manor Dr. to Doug Baker Blvd.
- Project Details
  - Designed by Sain Associates
  - 25 Intersections
  - 8 Miles
  - ALDOT Maintained System (Numerous Jurisdictions)
- Project Cost
  - $1.45 Million
  - Contract Awarded to American Lighting & Traffic Signals (May 2012 Letting)
  - November 16, 2012 (Completion Date)


Overton
CAHABA
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MOON GLOW LAKE
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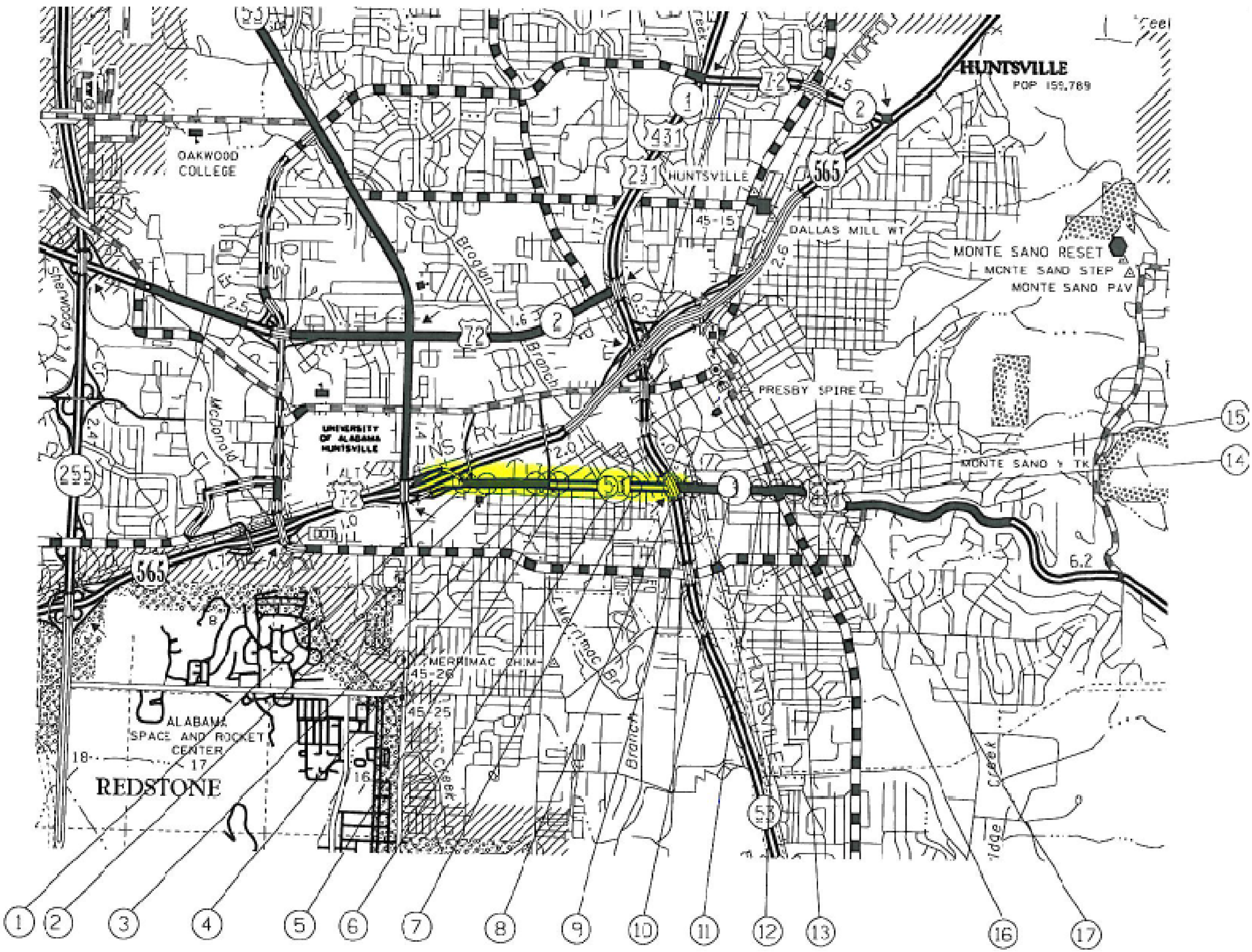
SCATS Birmingham, AL

- AADT Along US 280 – 60,000 to 80,000
  - Mostly Commuter Traffic
  - Traditional AM/Noon/PM Peaks
  - Variability During Events (Incidents/Evacuations)
    - Direct Access to I-459
  - Existing Closed Loop System
- Project Details
  - Existing Eagle Controllers – Upgrade to Eagle M-52
  - Utilize Existing Fiber Along Entire Corridor (Repairs)
  - New Video Detection Cameras Along Entire Corridor

SCATS Huntsville, AL

- Project Location – SR 53 (Governor's Drive)
  - 14th St. to California St.
- Project Details
  - Designed by Sain Associates
  - 16 Intersections
  - 2 Miles
  - City of Huntsville Maintenance Responsibility
- Project Cost
  - $960,000.00
  - Contract Awarded to Shoals Electric (May 2012 Letting)
  - November 16, 2012 (Completion Date)



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SCATS Huntsville, AL

- AADT Along Governor's Dr. – 18,000 to 24,000
  - Mostly Commuter Traffic (Hospital Complex)
  - Traditional AM/Noon/PM Peaks
  - Variability During Events (Incidents/Evacuations)
    - Direct Access to I-565
  - Existing Closed Loop System
- Project Details
  - Existing 170 Controllers Upgrading to 2070's
  - Utilize Existing Fiber Along Entire Corridor (City)
  - New Video Detection Cameras Along Entire Corridor

SCATS Before/After Studies

Safety and Operational Evaluation of

Adaptive Traffic Signal Control

- Project Objective - perform an operational and safety evaluation of three adaptive traffic signal control deployments (Birmingham, Huntsville and Montgomery) in Alabama. Specifically, the project will document changes in operational performance measures (delay, travel time, number of stops, crash rates, crash severity, etc.).
- Performed by UA and UAB

Safety and Operational Evaluation of Adaptive Traffic Signal Control

- Evaluation will be based on:
  - Before/After studies
  - Microsimulation modeling

Safety and Operational Evaluation of Adaptive Traffic Signal Control

- Before/After studies
  - Field observed travel times
  - Highway Capacity Manual-based LOS analyses of isolated intersections as appropriate
  - Crash data

Safety and Operational Evaluation of Adaptive Traffic Signal Control

- Simulation modeling
  - Coding existing conditions into VISSIM to develop base case for simulations
  - Simulate SCATS operations on study corridors using proprietary software (SCATSIM) to emulate SCATS control logic within VISSIM

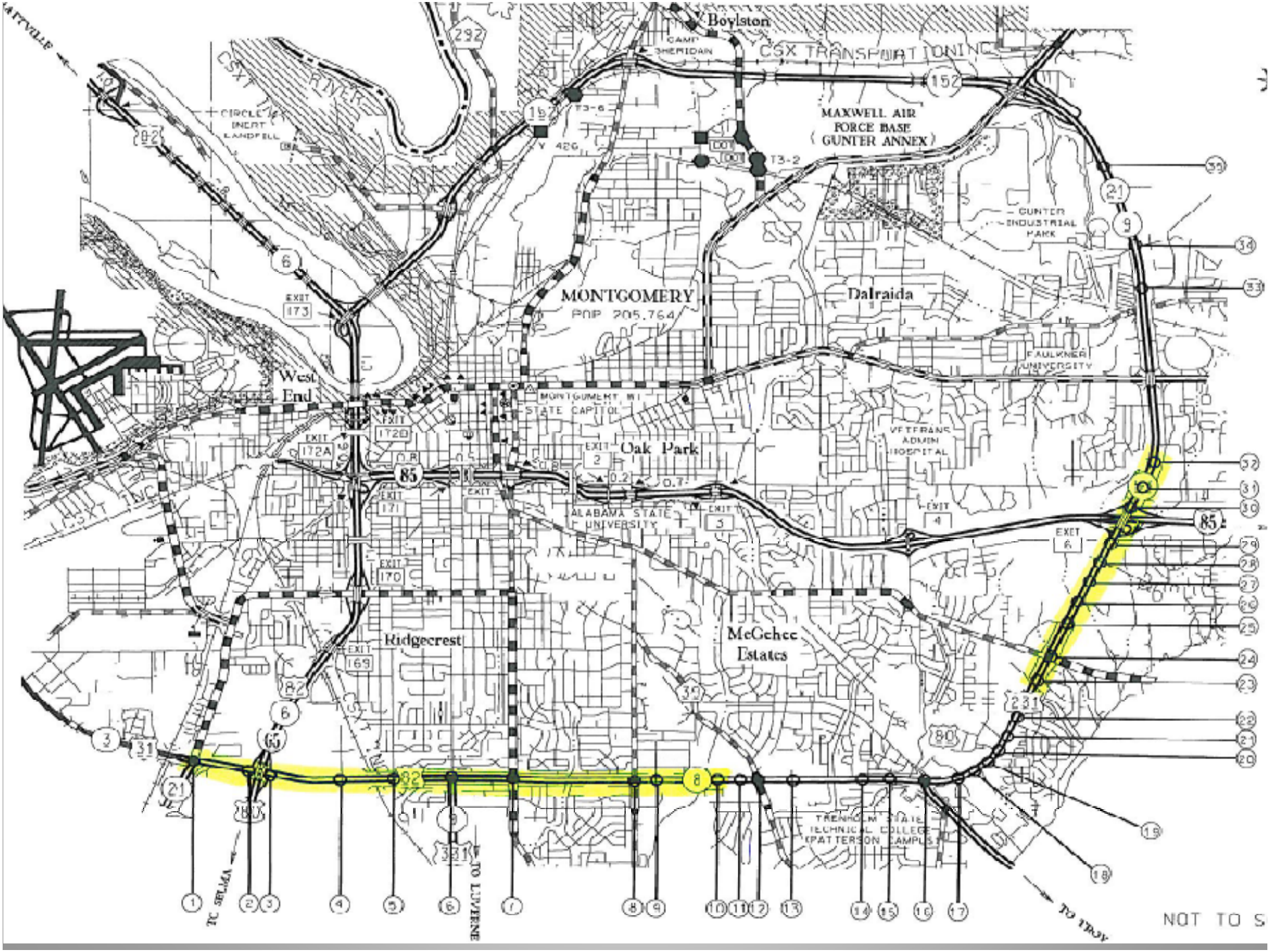
VISSIM + SCATS plug-in + SCATSIM

Safety and Operational Evaluation of Adaptive Traffic Signal Control

- Simulation modeling
  - Perform sensitivity analyses of simulated adaptive controls to estimate system ability to handle various scenarios:
    - Incidents
    - Varied volumes, directional splits, etc.
    - Addition of midblock generators
  - Compare modeled delay, travel times, etc.

SCATS Before/After Studies

- **Montgomery Corridor – Study PM peak and off-peak operations for two sub-corridors.**
  - Montgomery Test Corridor 1 – Irregular-spaced intersections. Covers the I-65 interchange intersections and others with spacing up to 0.5 miles
    - Begin before intersection #1 (South Blvd. @ U.S.31)
    - End after #10 (South Blvd. @ Woodley Square)
  - Montgomery Test Corridor 2 – Includes I-85 interchange, a major arterial intersection at Vaughn Road and numerous closely spaced minor intersections.
    - Begin before intersection #23 (East Blvd. @ Hitching Post Lane)
    - End after #32 (East Blvd. @ Shirley Lane)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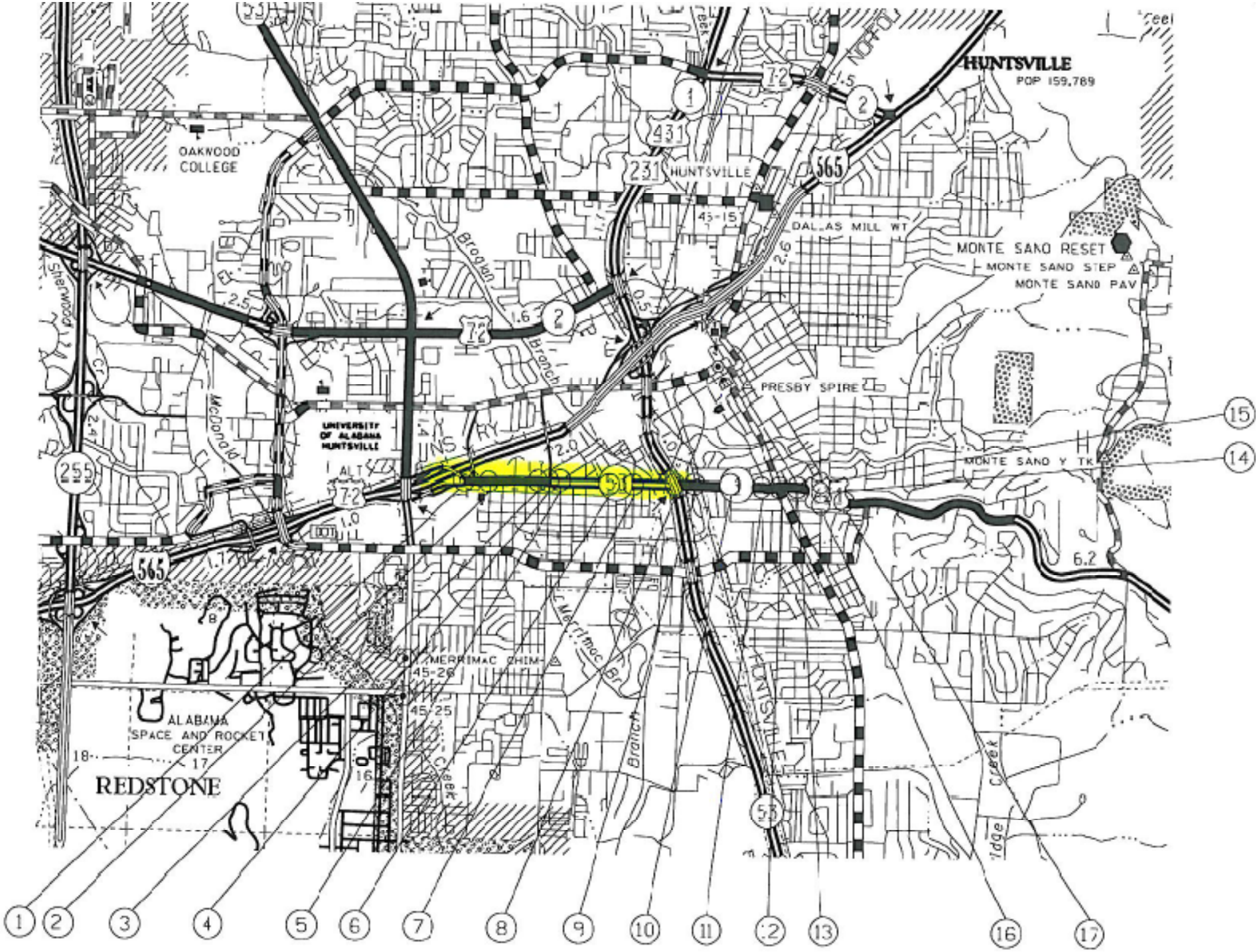
SCATS Before/After Studies

- **Huntsville Corridor – Study PM peak and off-peak operations for sub-corridor.**
  - Huntsville Test Corridor – Fairly uniformed-spaced mix of major and minor intersections including major interchanges at US 231 and I-565.
    - Begin before intersection #1 (SR 53 @ 14th Street)
    - End after #8 (SR 53 @ US 231)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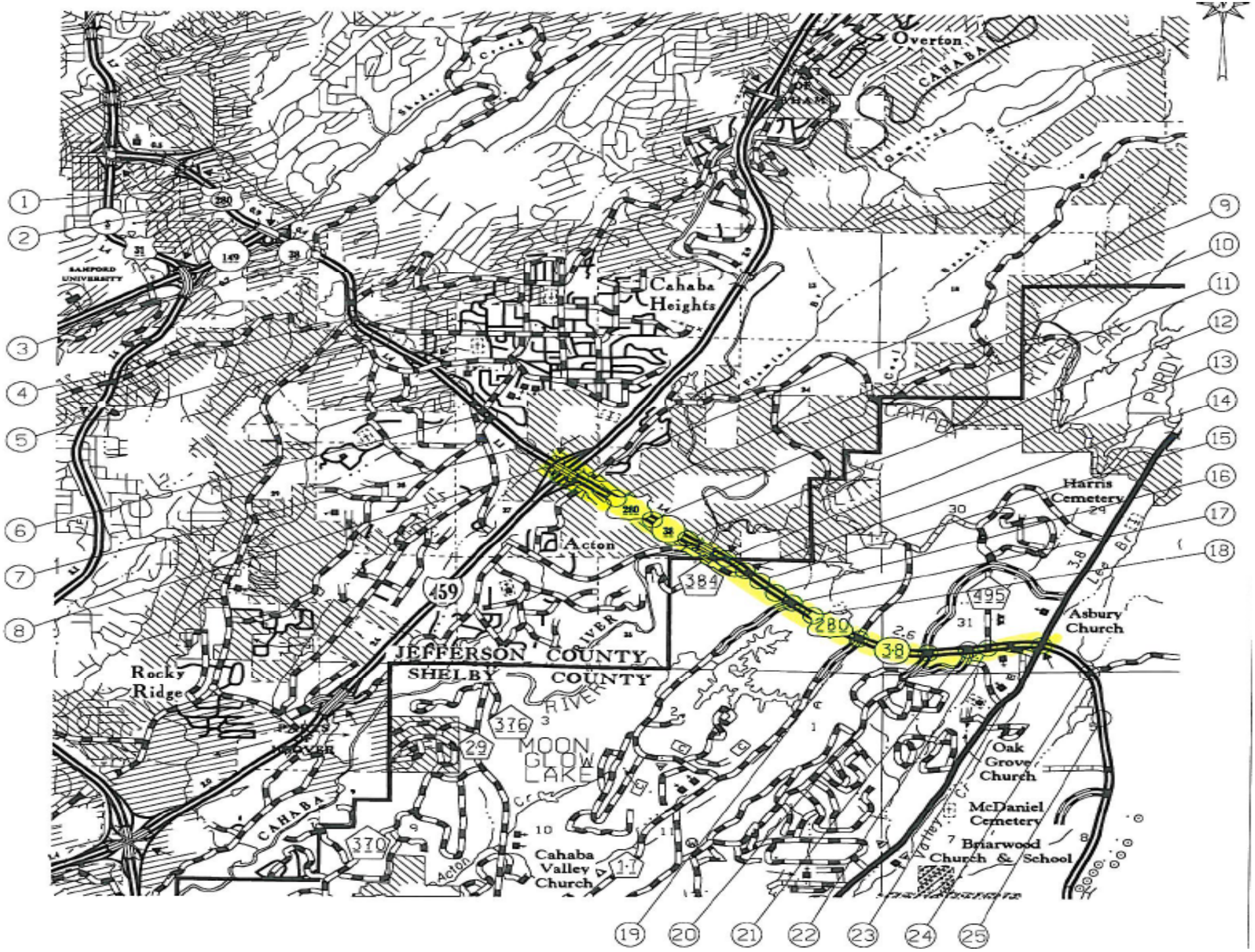
SCATS Before/After Studies

- **Birmingham Corridor – Study PM peak and off-peak operations for sub-corridor.**
  - Birmingham Test Corridor – Closely-spaced intersections along a congested corridor. Includes major arterial connections at SR 119 and CR 17 in addition to I-459 interchange.
    - Begin before intersection #8 (US 280 @ I-459 SB)
    - End after #23 (US 280 @ SR 119)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SHELBY COUNTY
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Oak Grove Church
McDaniel Cemetery
Briarwood Church & School
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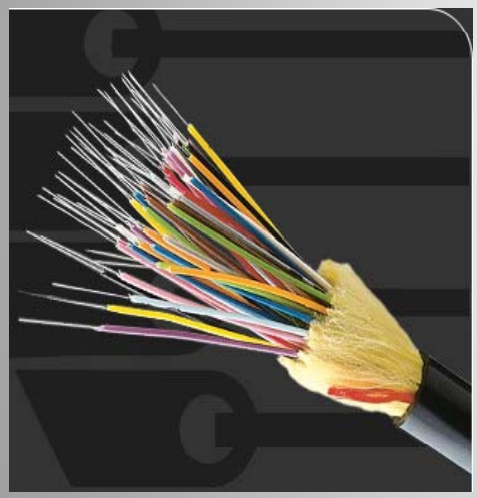
Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Existing Communications Network
  - Existing Signal System
  - Existing Equipment Compatible with ATSC
  - Vehicle Detection Technology
  - Route Types
  - Project Partners
  - Maintenance/License Agreements
  - Before/After Studies

Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Existing Communications Network



Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Existing Signal System

Adaptive Traffic Signal Control
The Alabama Experience

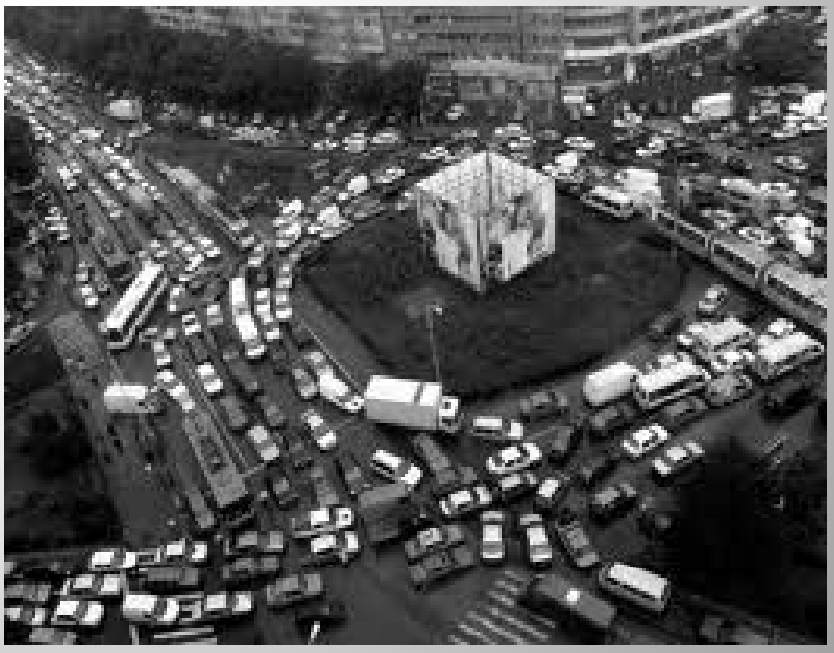
- Project Considerations
  - Existing Equipment Compatible with ATSC

Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Vehicle Detection Technology

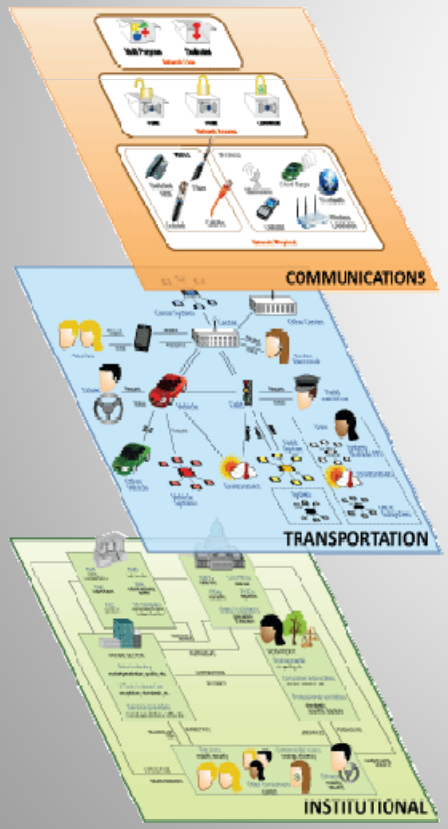
Adaptive Traffic Signal Control
The Alabama Experience

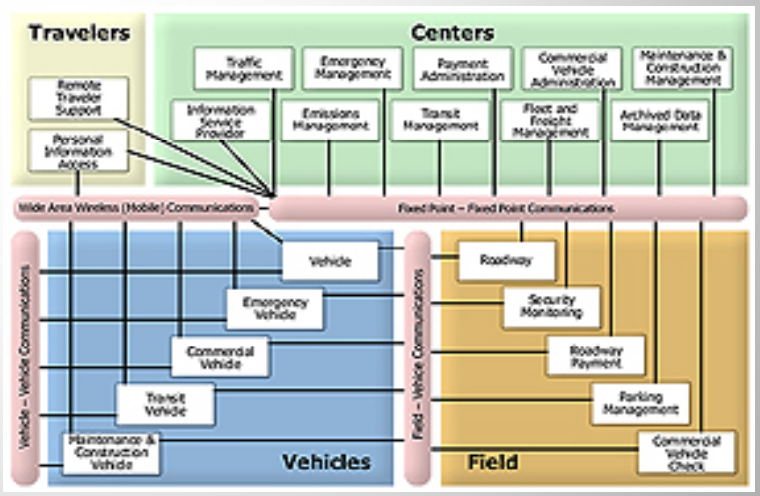
- Project Considerations
  - Route Types



Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Project Partners – ITS Architecture



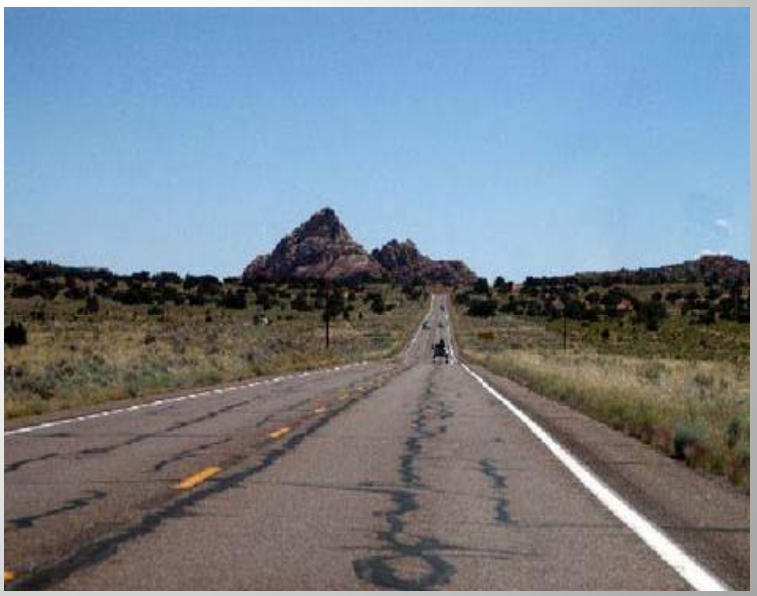


Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Maintenance/License Agreements

Adaptive Traffic Signal Control
The Alabama Experience

- Project Considerations
  - Before/After Studies



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