Data Collection, Management, and Modeling using GPS/GIS

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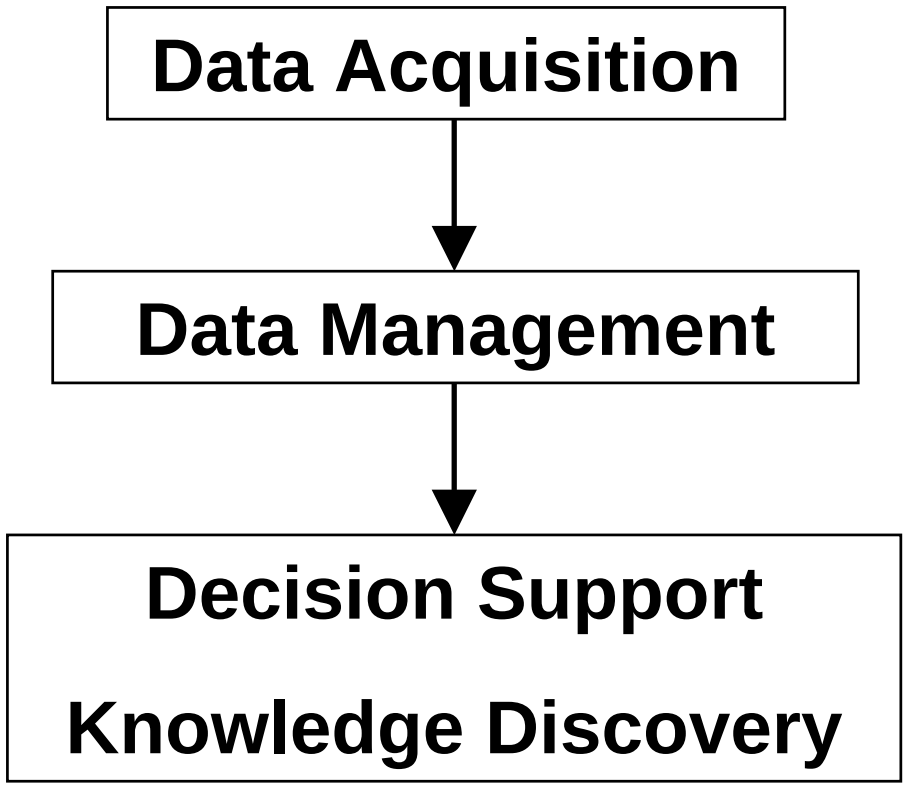
Outline

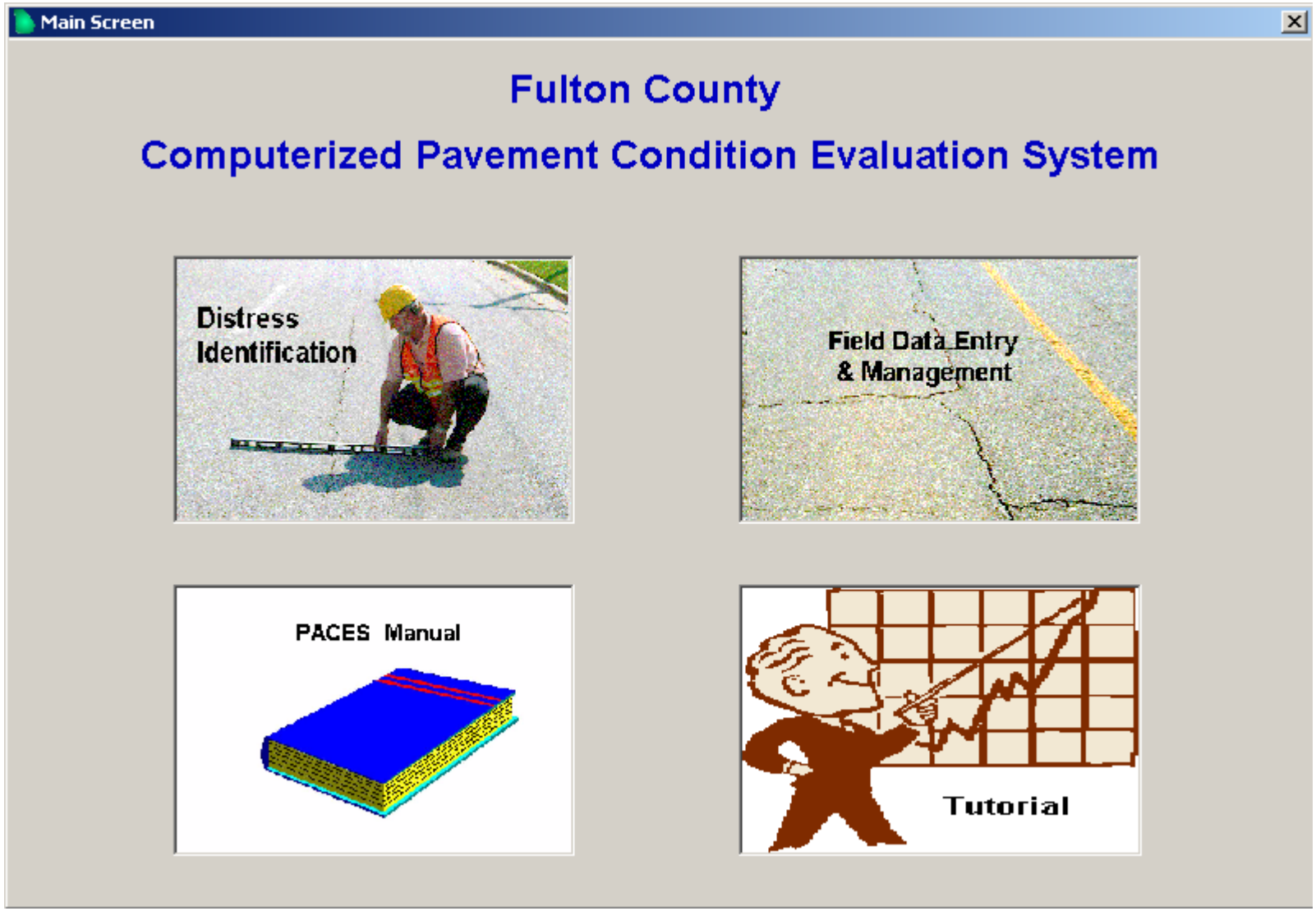
- Components of Pavement Management
- Data collection case
- Data Management case
- Data Modeling case
- Benefits of using GPS/GIS

Components in Pavement Management

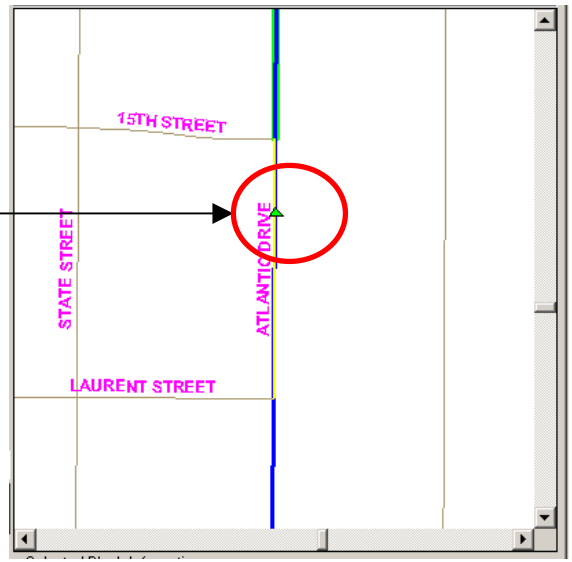


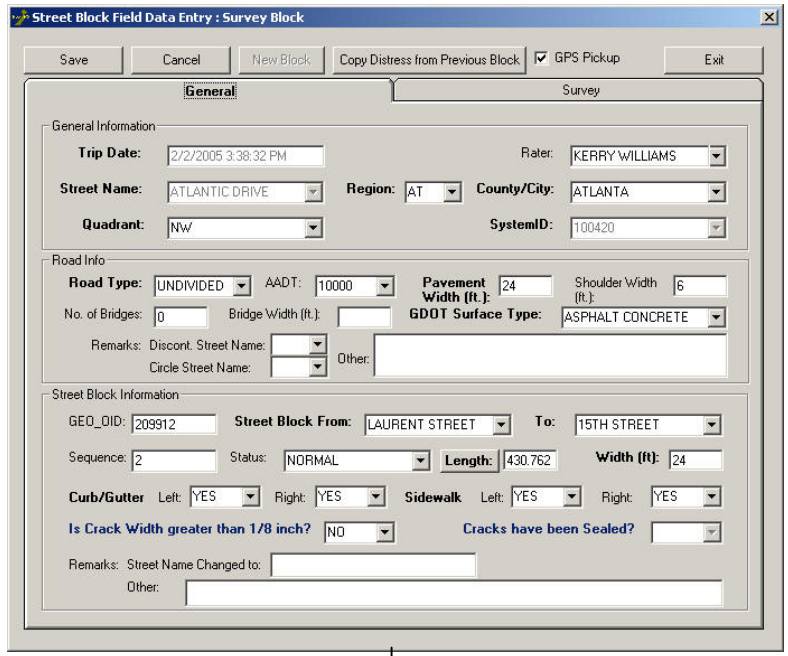
Data Collection Using GPS/GIS – Fulton County Case

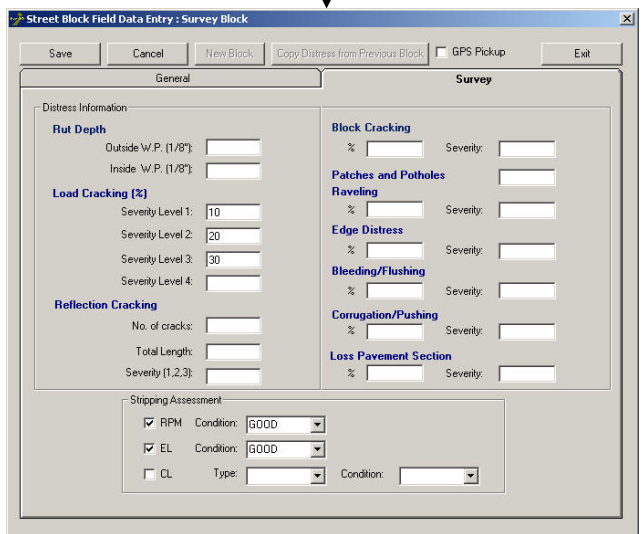
GPS/GIS-based Data Collection - 1

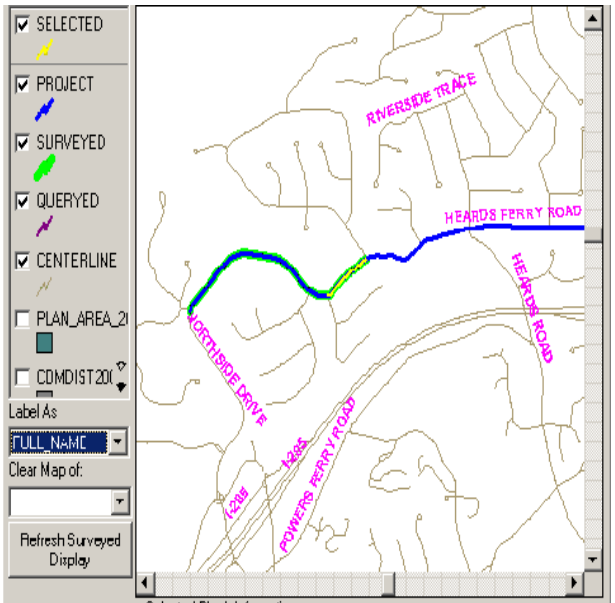


GPS/GIS-based Data Collection - 2



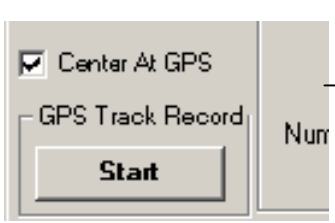


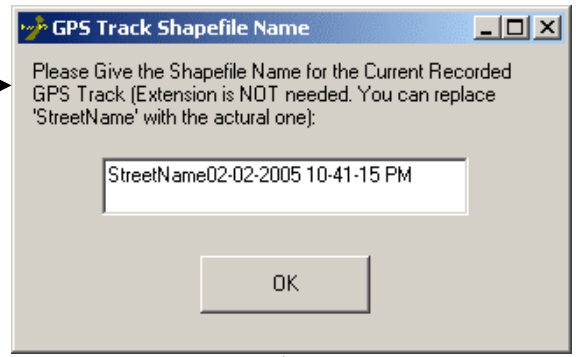


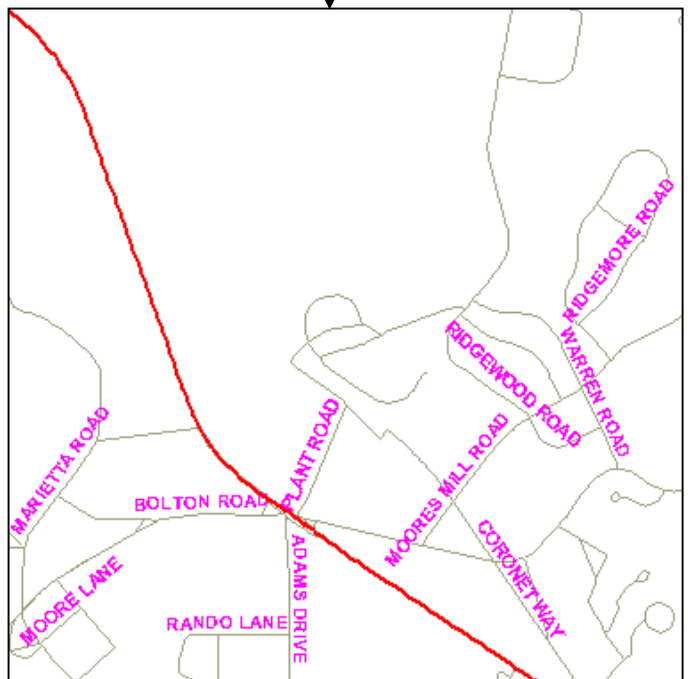


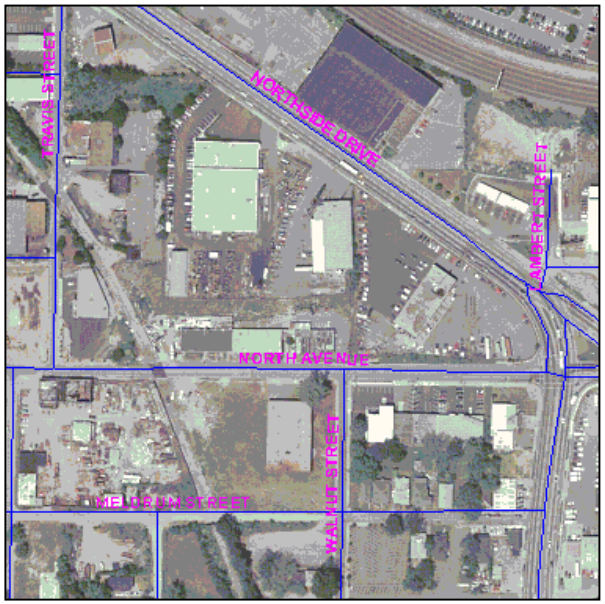
GPS/GIS-based Data Collection - 3

- **Can also collect the GPS/GIS data for new streets.**
- **Can integrate with aerial photo.**



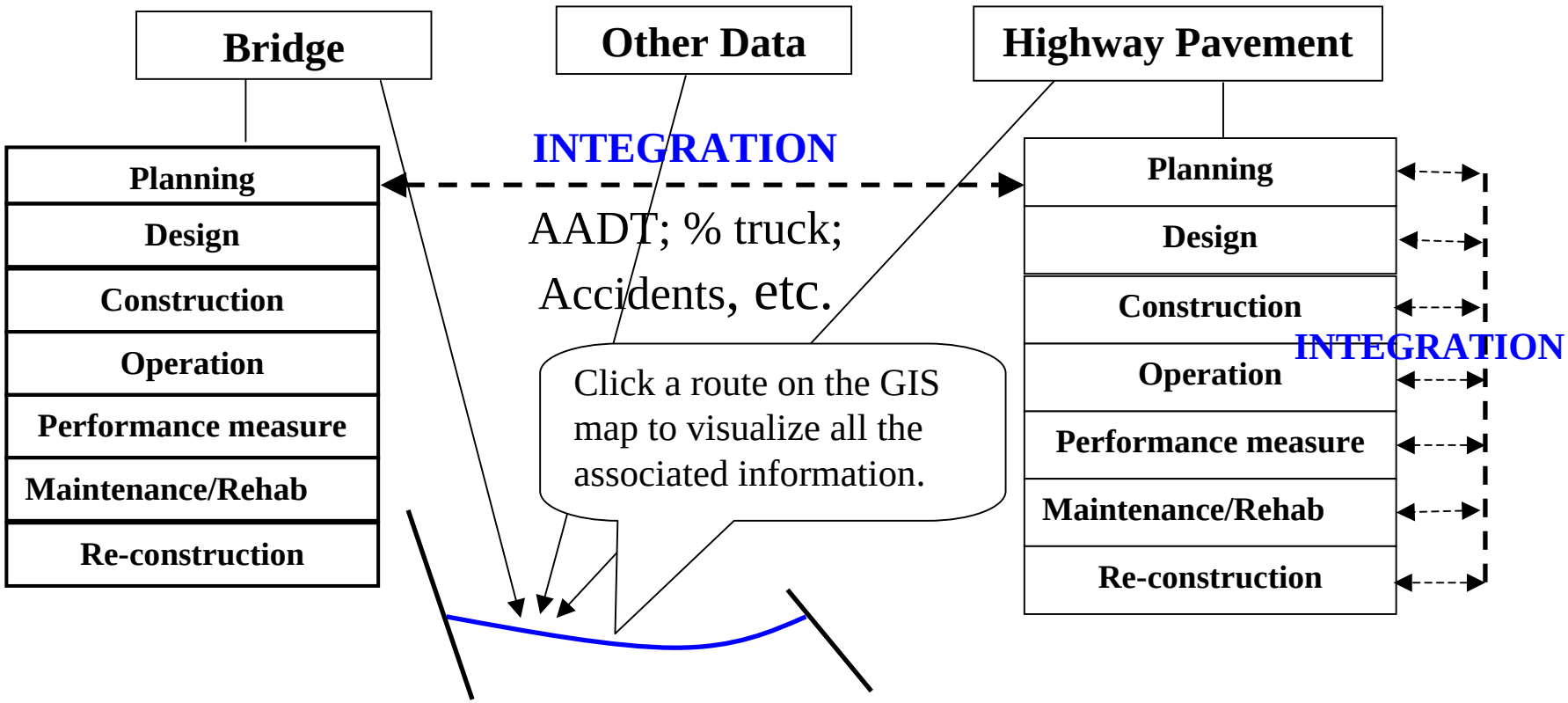






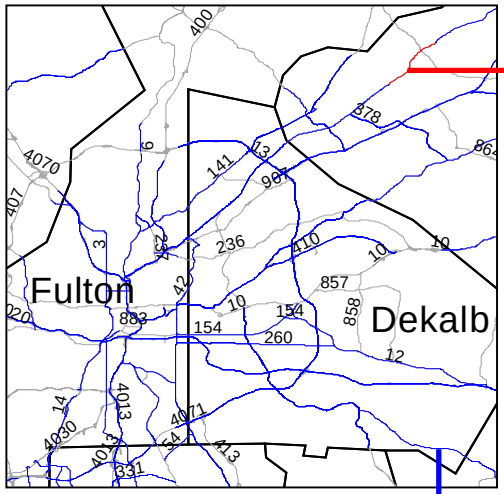
Data Management Using GIS – GDOT Case

GIS for Data Integration and Analysis



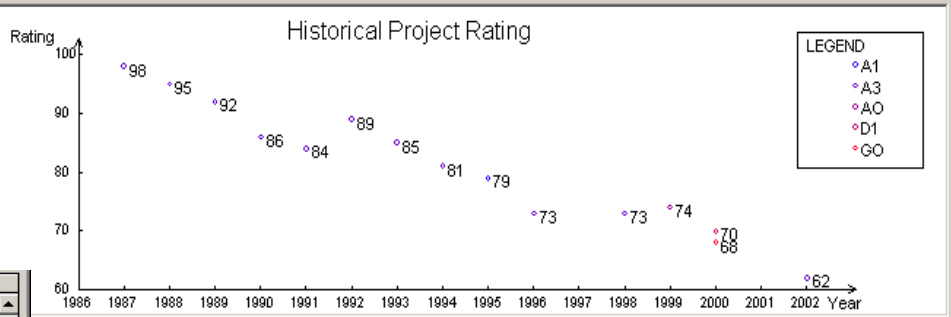
Common Location Reference System (LRS)

Historical Pavement Performance Analysis



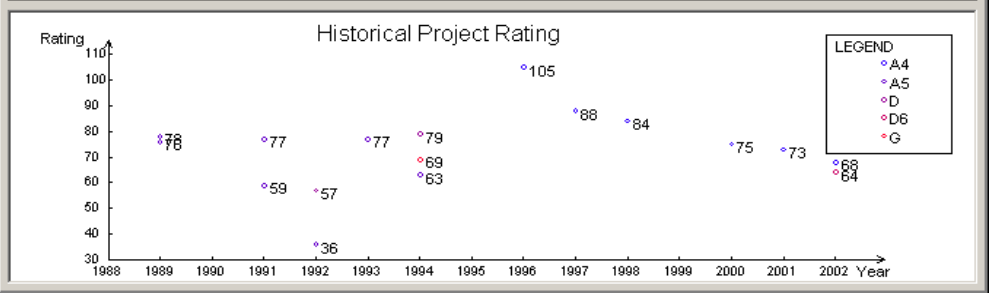
Historical survey data of selected project

Status	Tripdate	RouteN	RouteS	RouteT	Project	Rater	Distr	Office	Count	MilePo	MilePos	AADT
NORMAL	5/13/1992 6:47:06 AM	0051	00	1	89	JAMES MOORE	1	A3	147	10.7	14.7	
NORMAL	6/2/1993 8:14:44 AM	0051	00	1	85	JAMES MOORE	1	A3	147	10.6	14.7	
NORMAL	4/11/1994 12:59:09 PM	0051	00	1	81	JAMES MOORE	1	A3	147	10.7	14.4	
NORMAL	4/20/1995 1:58:57 PM	0051	00	1	79	JAMES S. MOORE	1	A1	147	10.7	14.4	
NORMAL	3/26/1996 5:03:31 PM	0051	00	1	73	FRED T. APPLING	1	A3	147	10.7	14.4	
NORMAL	4/3/1998 1:43:39 PM	0051	00	1	73	JEFF JACQUES	1	A3	147	10.7	14.4	
Normal	2/25/1999 7:45:15 AM	0051	00	1	74	JEFF JACQUES	1	AO	147	10.7	14.4	11800
NORMAL	1/20/2000 2:35:18 PM	0051	00	1	68	JEFF JACQUES	1	A3	147	10.7	14.4	11800
NORMAL	1/21/2000 4:49:56 PM	0051	00	1	70	GREGORY	1	D1	147	10.7	14.4	11800
NORMAL	2/17/2000 9:07:55 AM	0051	00	1	68	SWINFORD	1	GO	147	10.7	14.4	11800
NORMAL	10/17/2001 8:29:50 AM	0051	00	1	62	TMCDUFFIE	1	A3	147	10.7	14.4	11800



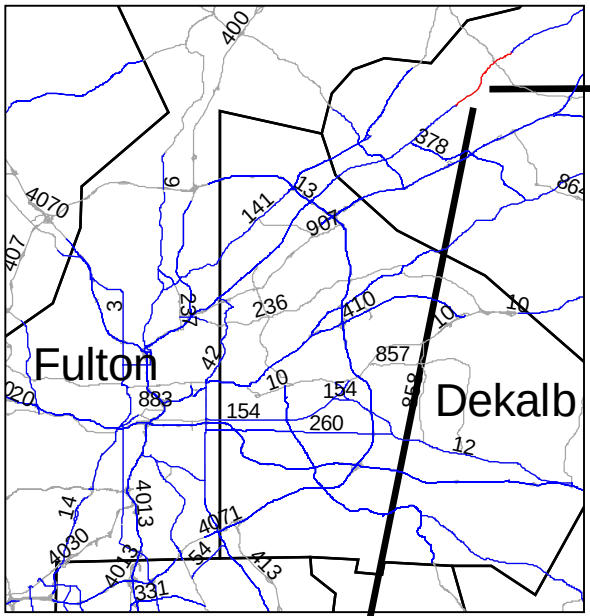
Historical survey data of selected project

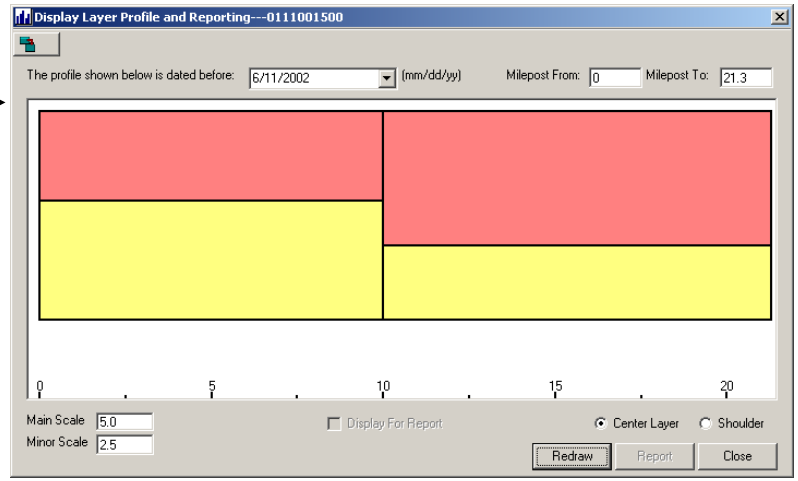
Status	Tripdate	RouteN	RouteSu	RouteT	Project	Rater	Distr	Offic	Count	MilePo	MilePostT	AADT
NORMAL	4/21/1993 7:(	0053	00	1	77	TERRY WRIGHT	6	A5	115	21.9	23.7	
NORMAL	2/7/1994 12:(	0053	00	1	63	TERRY D. WRIGHT	6	A5	115	21.8	23.4	
NORMAL	3/10/1994 12	0053	00	1	79	CLIFF HARDEN	6	D	115	21.8	23.4	
NORMAL	5/24/1994 12	0053	00	1	69	TERRY JONES	6	G	115	21.8	23.4	
UNDER CON	8/2/1995 2:5(	0053	00	1	105	TERRY WRIGHT	6	A4	115	21.8	23.4	
NORMAL	6/13/1997 3:(	0053	00	1	88	TERRY D. WRIGHT	6	A4	115	21.8	23.4	
NORMAL	6/5/1998 1:3(	0053	00	1	84	GARRY PRATHER	6	A4	115	21.8	23.4	
NORMAL	2/9/2000 8:5(	0053	00	1	75	GARRY PRATHER	6	A4	115	21.8	23.4	20000
NORMAL	10/13/2000 1(	0053	00	1	73	GARRY PRATHER	6	A4	115	21.8	23.4	20000
NORMAL	10/24/2001 9(	0053	00	1	68	GARRY PRATHER	6	A4	115	21.8	23.4	20000
NORMAL	4/30/2002 9:(	0053	00	1	64	T .RUTLEDGE	6	D6	115	21.8	23.4	39800

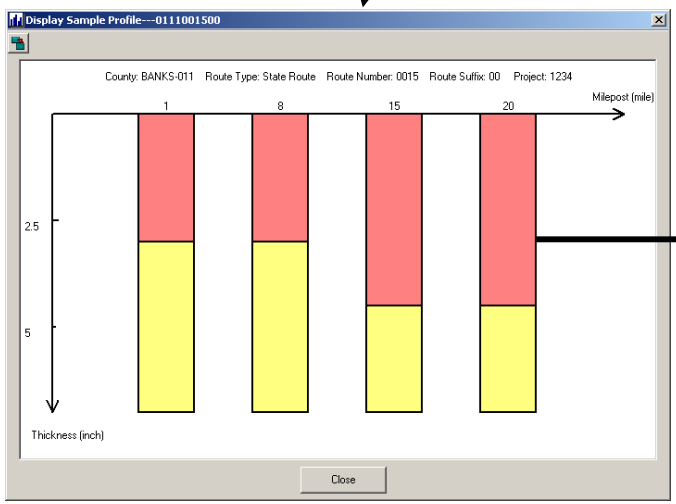


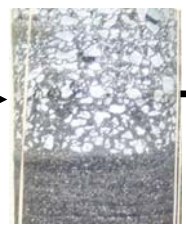
Project-level

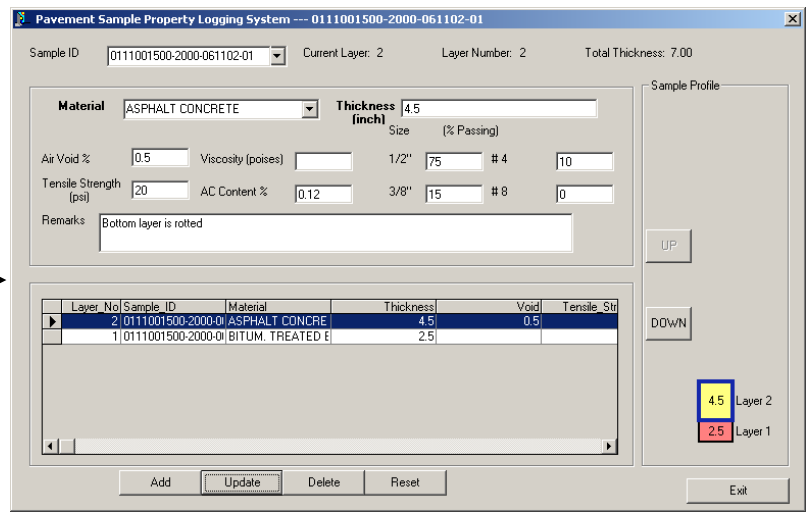
Pavement Thickness and Material



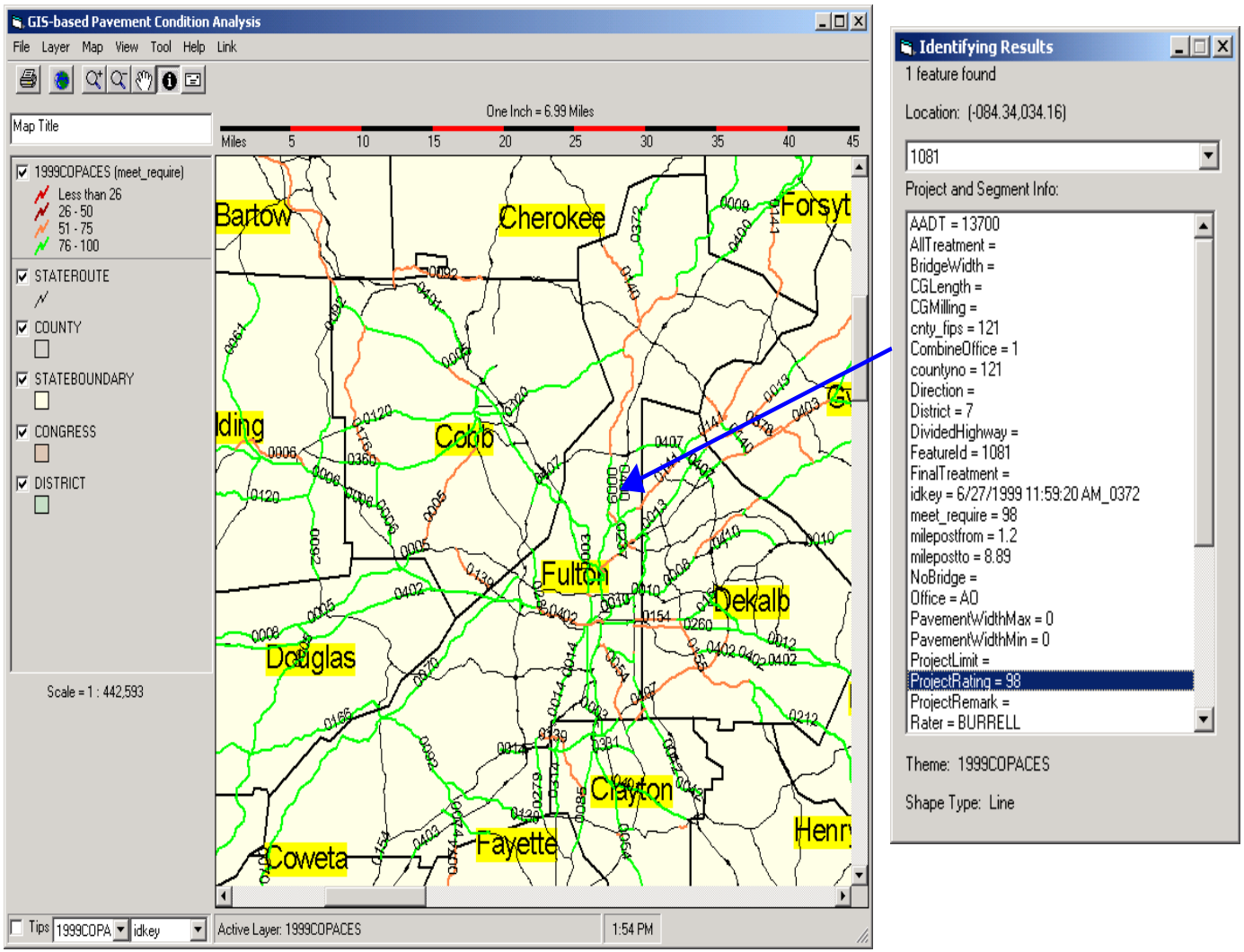




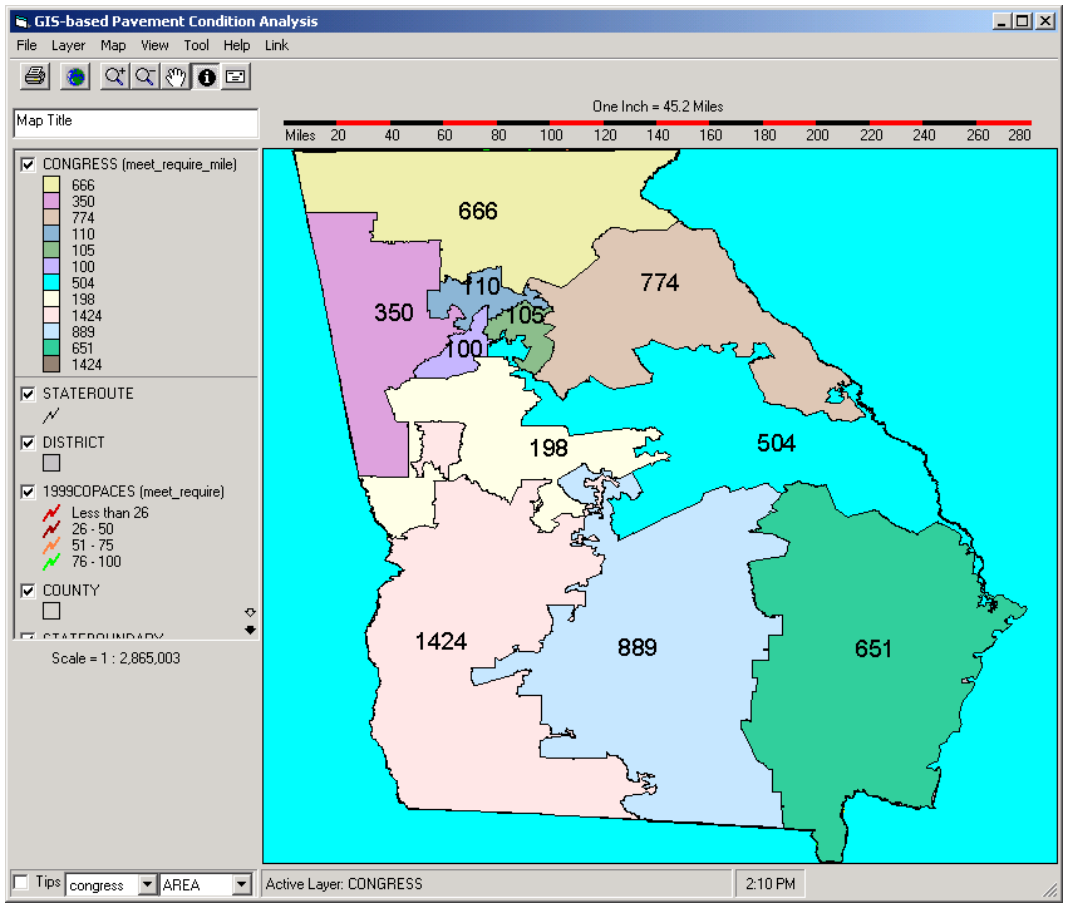




Visualization and Identification of Project-level Pavement Information

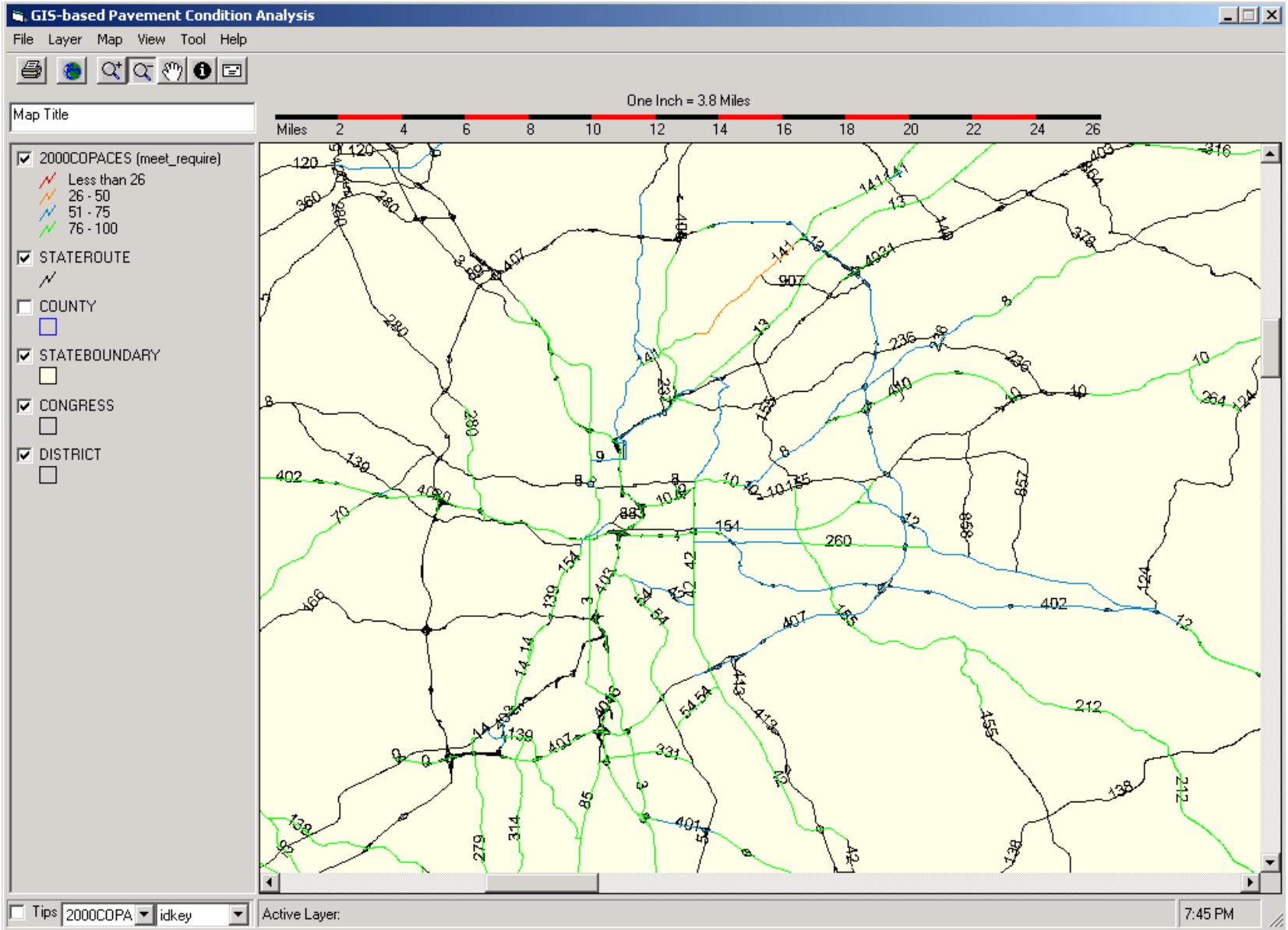


Spatial Analysis for Visualizing and Quantifying Pavement Information for Different Jurisdictions

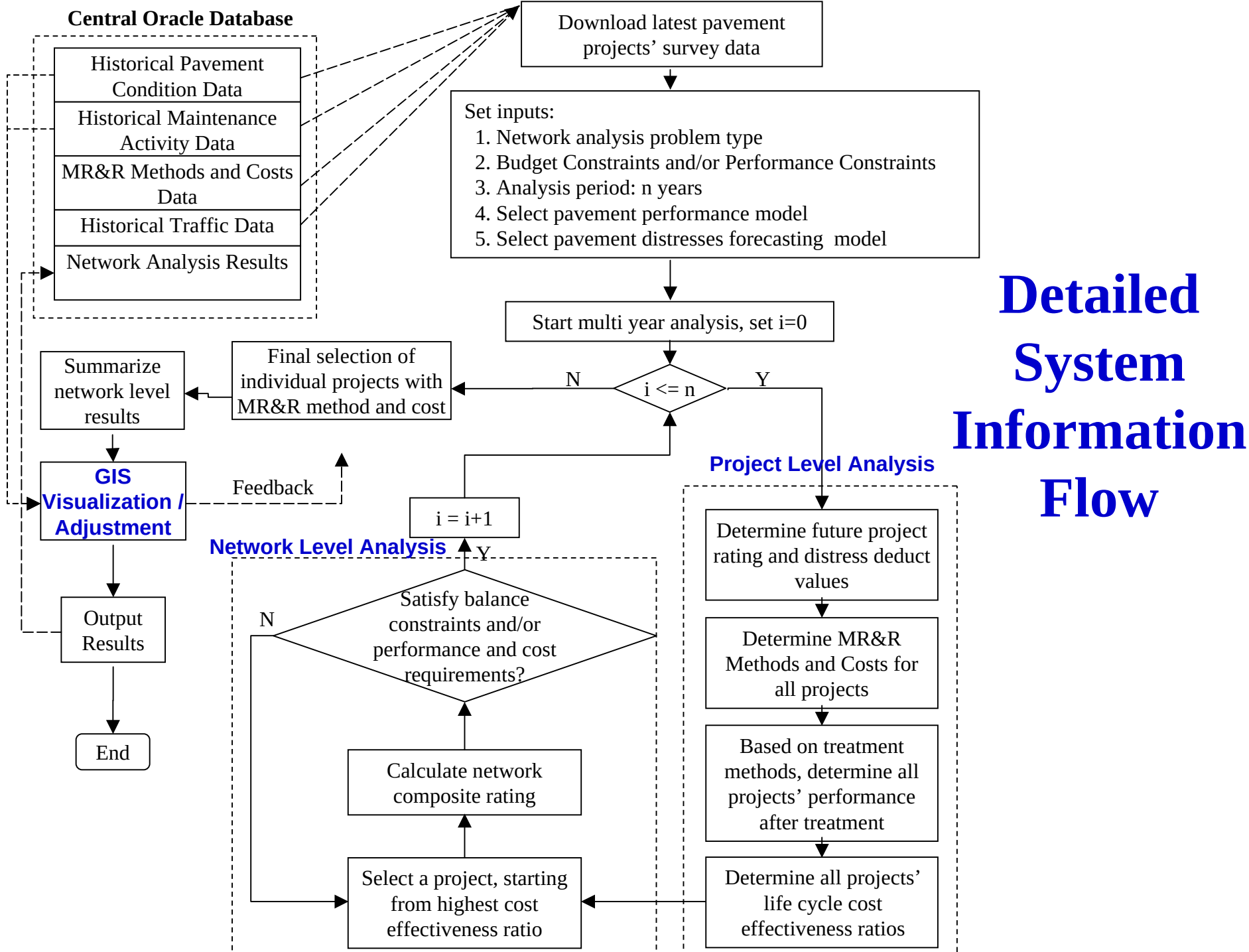


Total Miles for Projects with Rating Values Less Than and Equal to 80 in Each Congressional District

Network-level Pavement Condition

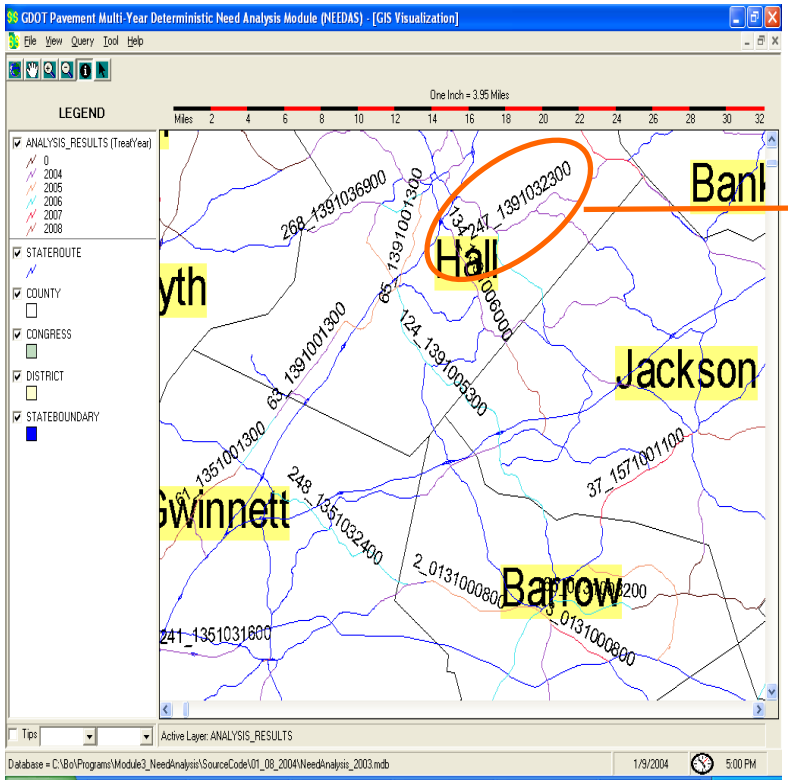


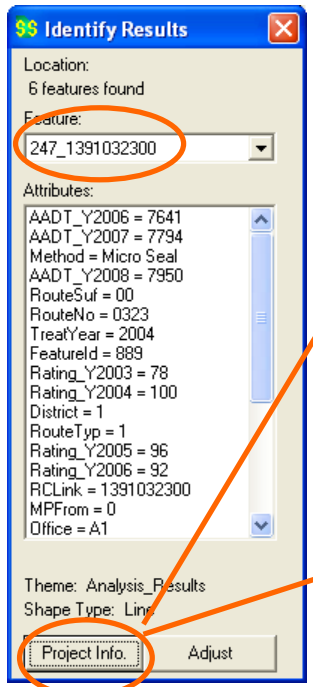
Data Modeling Using GIS – GDOT Case

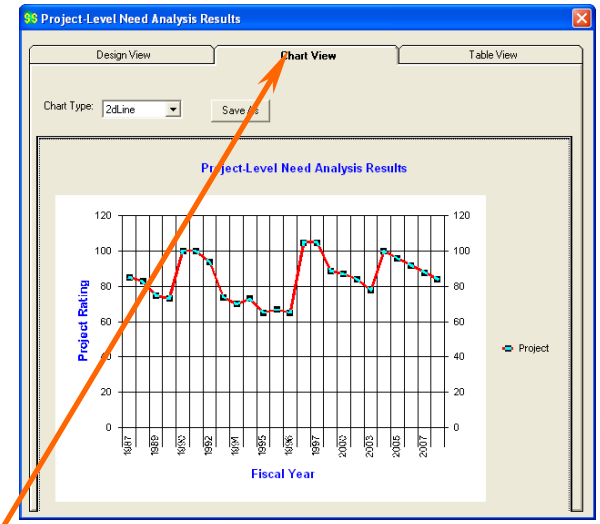


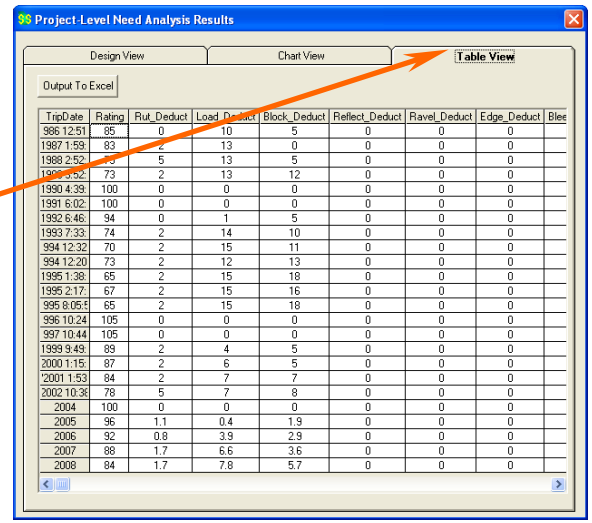
Detailed System Information Flow

Project-Level Results

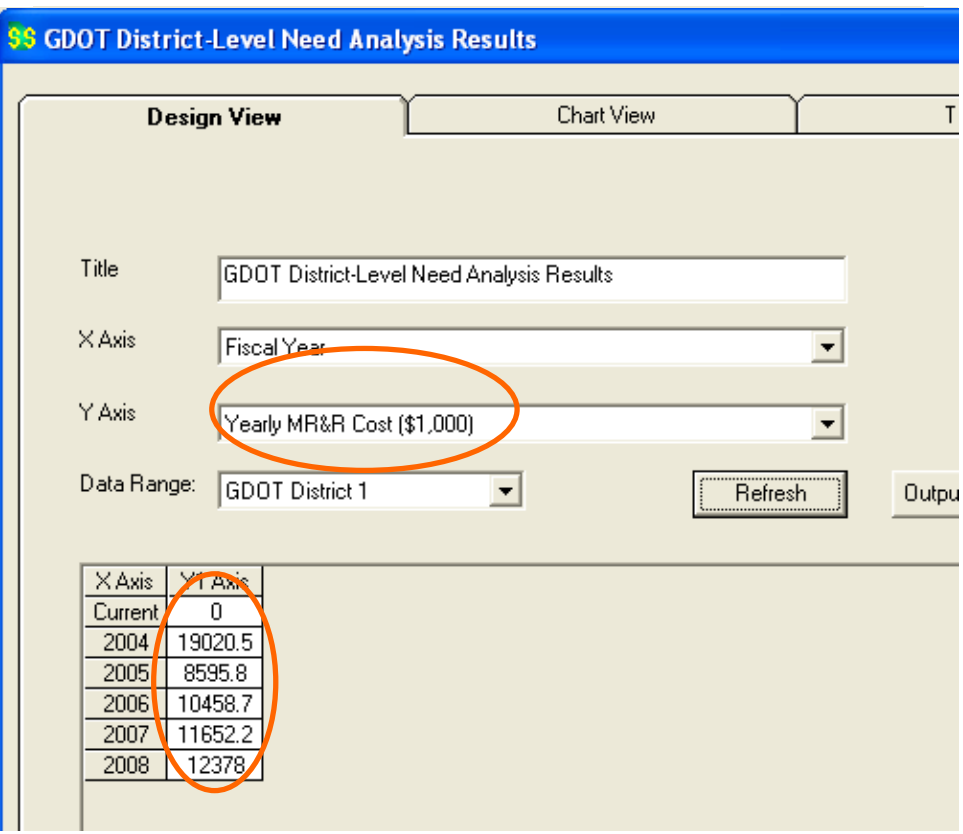


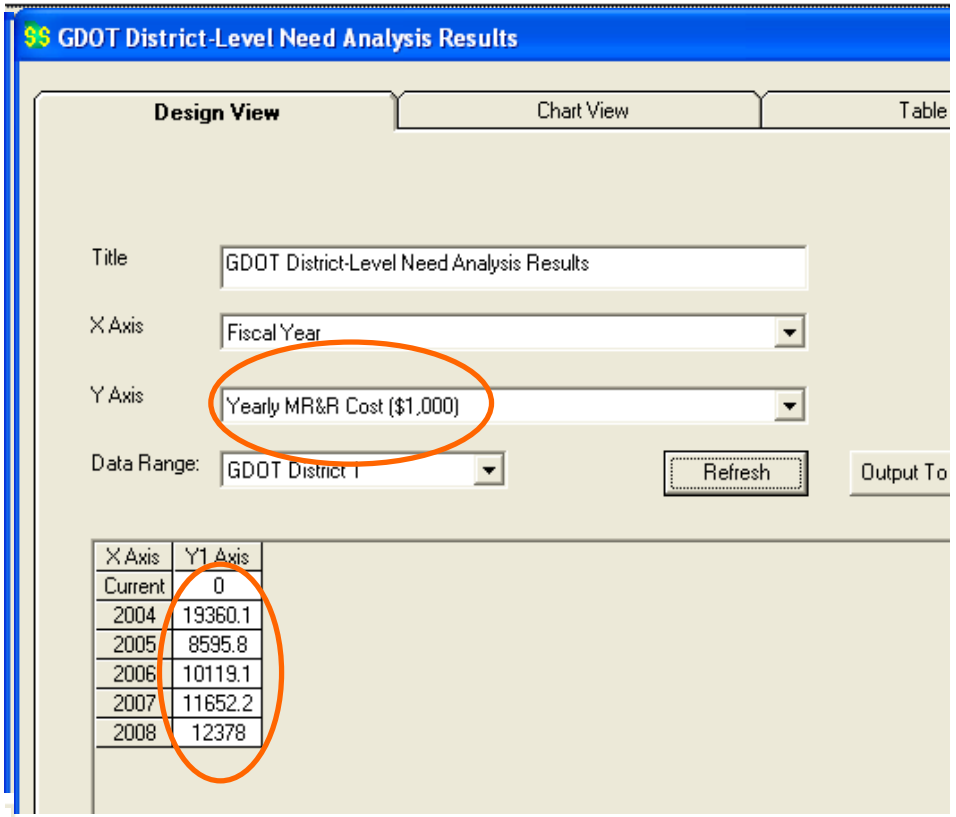


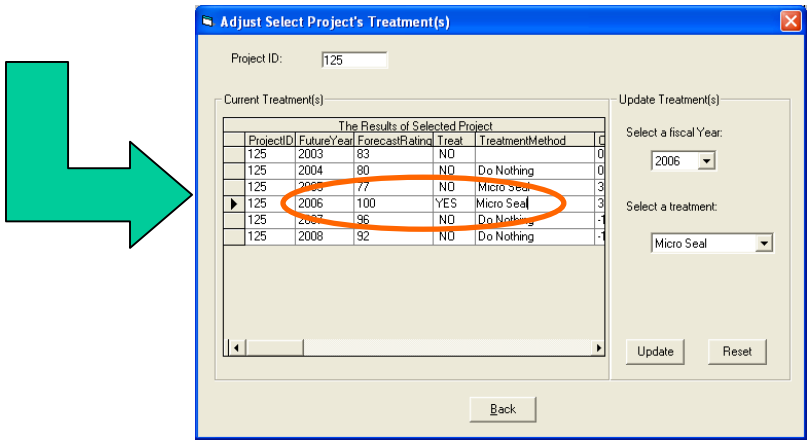


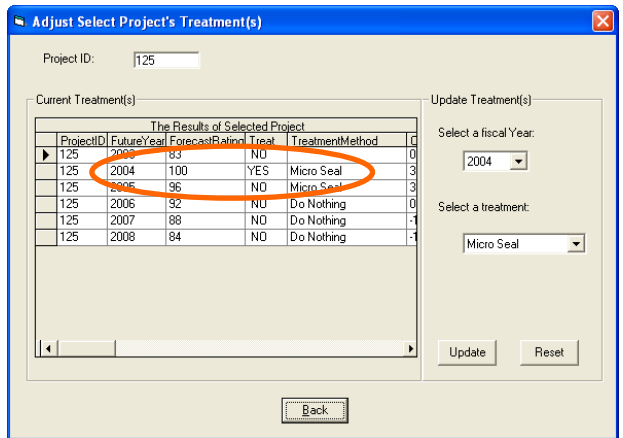


Impact on Network-Level – Cost









Benefits of GPS/GIS

- Improve data collection productivity and data quality.
- Support integration of different data based on their common location reference. This will lead to
  - Easier data access
  - Easier data correlation
  - More accurate performance forecasting
  - More reliable economic analysis
  - Prompter pavement management response
  - More effective cross-asset management

Benefits of GPS/GIS (Cont.)

- Visualize pavement condition such as historical and predicted pavement performance.
- Determine pavement performance at different jurisdiction levels using spatial analysis
- Determine logic project termini based on pavement condition and network connectivity.
- Facilitate data management and decision making by clicking a route to access all roadway info.
- Integrate with “what-if” analysis and modeling based on different treatment scenarios and balancing constraints to facilitate decision making.

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Questions

Contact Info

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