

Materials & Research



Setting the Standard

Roadway Asset Management

Section Functionality

The Roadway Asset Management (RAM) Section is a customer driven section with customers ranging from the United States Congress, the general public, all the way to the co-worker in the next cubicle. It is our goal to function as a team in order to provide the most accurate and timely information possible to this range of customers. This section collects and maintains;

- Pavement condition data for the 10,000-mile State Highway System
- Inventory data for the 86,000 miles of city and county highways,
- GPS centerline file
- Perspective images for the entire State Highway System
- Geometric data for all roadways

The RAM section is responsible for items such as:

- Nebraska Enterprise Centerline Transportation Attribute Resource (NECTAR)
- Highway Performance Monitoring System (HPMS)
- Menu Aided Display of Digital Maps (MADDOG)
- County Maps
- Linear Referencing System (Logbook)
- Pavement Optimization Program (POP)
- Pathweb
- Pavement condition Performance Measures,
- Annual Needs Assessment,
- Annual pavement rehabilitation project candidate lists,
- Allocation percentages for the annual District construction budgets,
- State and Federal Functional Classification Systems
- State Highway Map

Pavement Management Unit

Surface Distress Survey Manual

This manual describes the methods and techniques used by NDOR personnel in visually rating roads in Nebraska. It includes verbal descriptions and pictures of both asphalt and portland cement concrete roads in various stages of deterioration. Each mile of state maintained road is evaluated every year. Rating data collected is used by the Pavement Optimization Program (POP), Pathweb and others. These programs are available for all NDOR personnel.

Surface Distress Survey

Manual

Nebraska Department of Roads
Materials and Research Division
Roadway Asset Management Section



Prepared by
Pavement Management Unit



RANDOM/GRID BLOCK
CRACKING -
EXTREME SEVERITY



Transverse Cracking-
Extreme Severity



Slab Cracking -
Class II



Regular Joint- High
Severity



Pattern Cracking- High
Severity



Alligator Cracking- High
Severity



Shoulder Deterioration-
High Severity

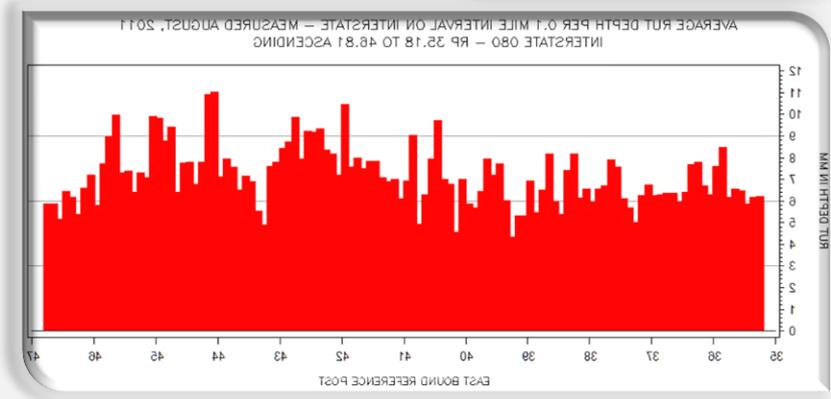
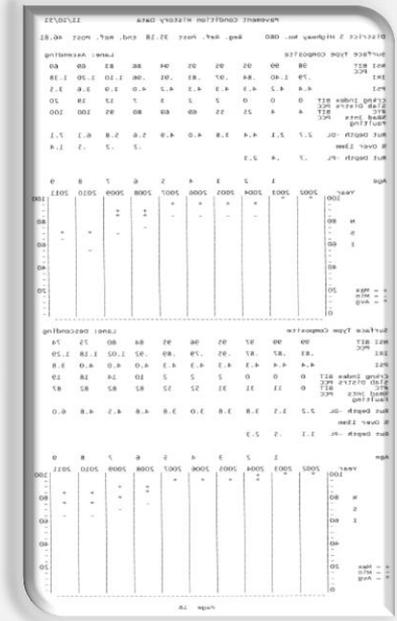
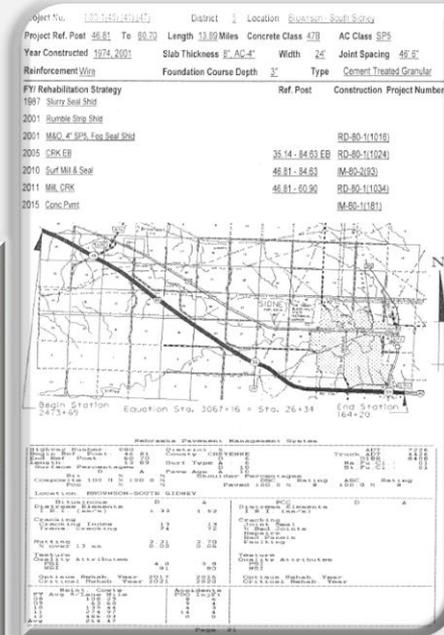
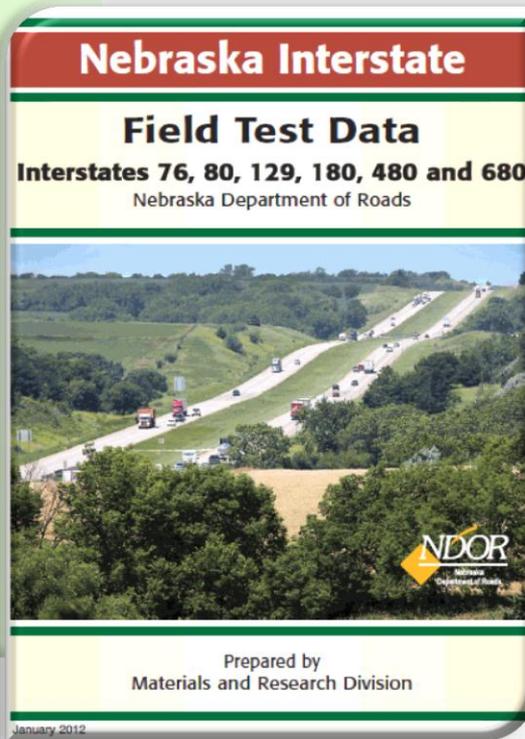


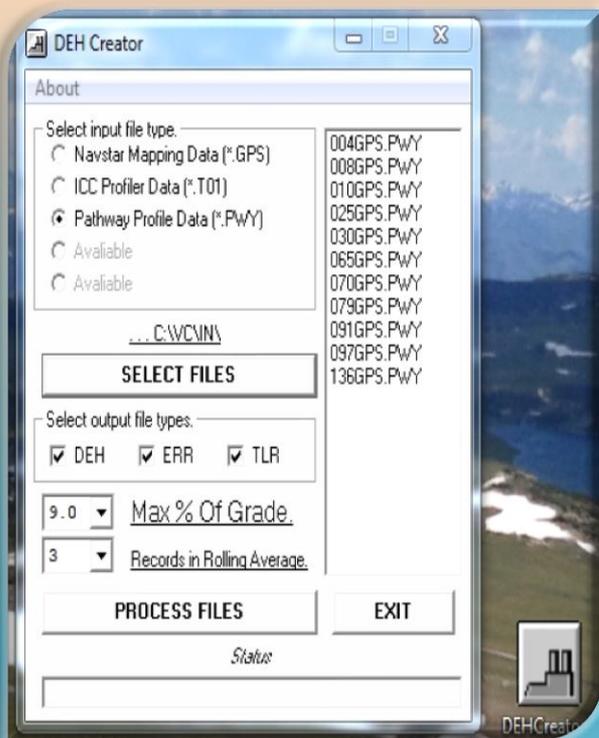
Repaired Joint- High
Severity



Nebraska Interstate Field Test Data

This book provides information to the Interstate Task Force and others working on interstate projects. It provides historical and current rating data, maps, future and past construction projects, description of the location, current surfacing, and other information. A supplemental report is included that contains graphs of the latest rutting and fault depths measured on the interstate for each tenth of a mile.





The original DEH file structure was developed by Navstar Mapping Corporation for evaluating and reporting vertical and horizontal curve data.

The 'DEH Creator' is a VB utility program created by the Roadway Asset Management Section of the M&R Division. This software is used to create the DEH "Distance Elevation Heading" file format. The main function of 'DEH Creator' is to translate vector data from other sources into the DEH file format.

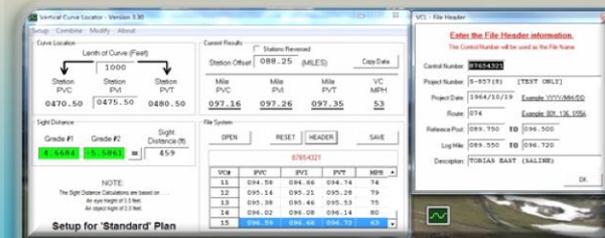
This translator does more than simply copy data to a new form. The raw data is first analyzed for quality, flagged for repair and then regenerated if needed. For example, if a section of road is missing a series of elevation points, the software repairs the data by extrapolating elevation points using the "present of grade" calculations before and after the missing segment. In this way the 'DEH Creator' software is capable of repairing errors by creating new data when there were omissions in a data string.

Direction Elevation Heading

Pavement Management Unit

The VCL program (Vertical Curve Locator) is a VB utility program created by the Roadway Asset Management Section of M&R Division. This software utilizes information obtained from "as built" construction plans for input in the form of stations with percent of grade. It then outputs vertical curve data in the form of crest log mile with a minimum safe stopping sight distance. It can be setup to run calculations for both standard and metric plan information.

The user interface is as simple as a common math calculator to speed data entry. However, it is capable of storing the calculated information for populating a table within the IHI mainframe system.

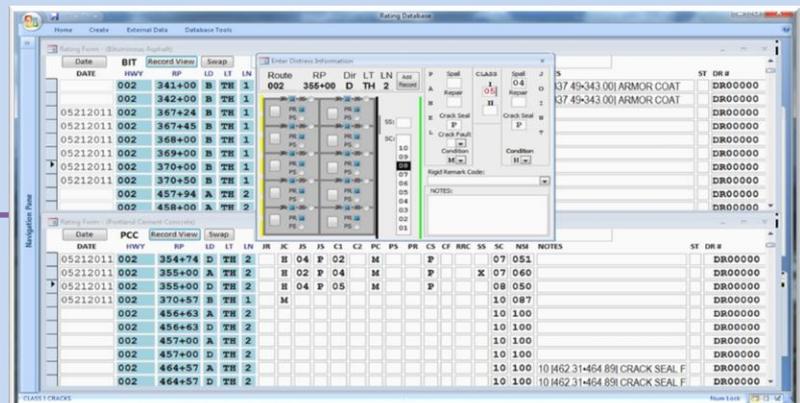
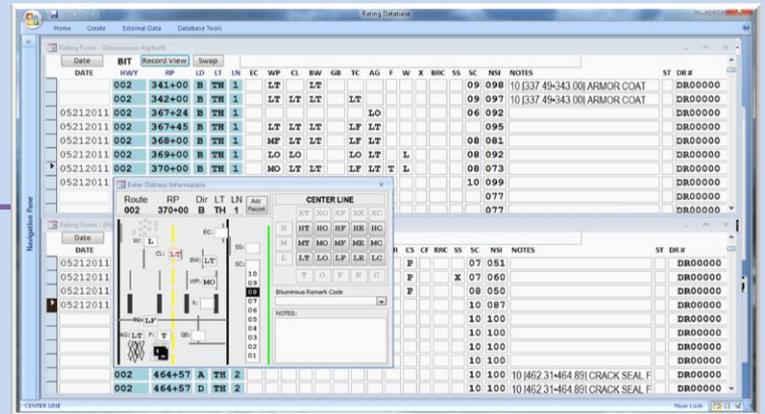


Vertical Curve Locator Program

Rating Database

The 'Rating Database', using a Microsoft Access platform, has been enhanced with input forms and VB software created by the Roadway Asset Management Section of the M&R Division. This database is used to log the individual road distresses of hard surface roads to find the overall condition of roads for the departments needs studies. There are many enhancements that are used to assure quality data collection and eliminate potential errors. Quick data retrieval for a given mile point aids in the fast data collection. The color flagging of potential data issues visuals shows key punch errors. When data is entered that does not conform to certain rating rules, the colors green, yellow, and red are used to indicate the severity of the rating rule violations. This tool helps to insure roads are rated accurately and efficiently.

Pavement Management Unit



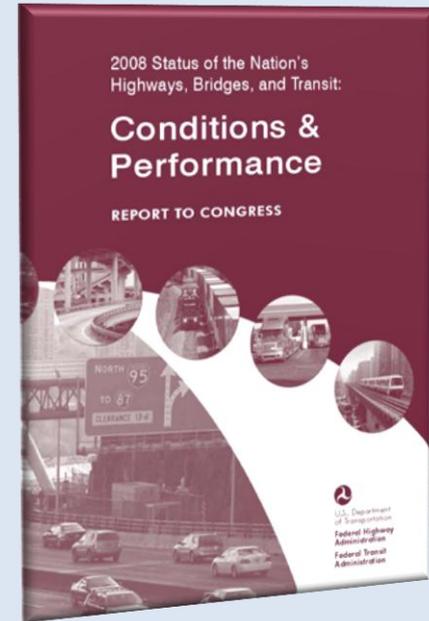
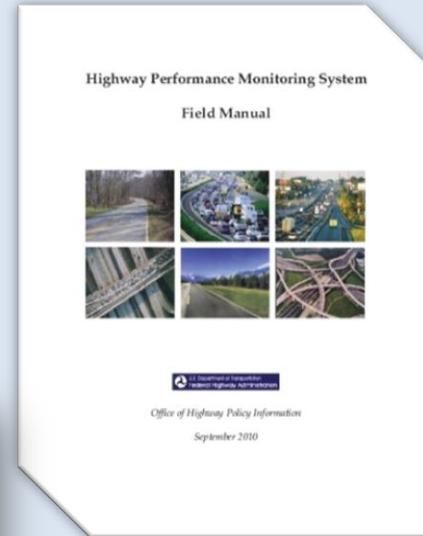
Roadway Data Mgt/Classification & Needs Unit

The HPMS is submitted to the FHWA annually by the unit. This is a source of information used by FHWA to analyze the nation's highway system condition, performance and investment needs that are reported to congress in the biennial Condition and Performance Report. Information is also published in FHWA's annual Highway Statistics report.

[OHPI Home](#) > Highway Performance Monitoring System (HPMS)

The HPMS is a national level highway information system that includes data on the extent, condition, performance, use and operating characteristics of the nation's highways. The HPMS contains administrative and extent of system information on all public roads, while information on other characteristics is represented in HPMS as a mix of universe and sample data for arterial and collector functional systems. Limited information on travel and paved miles is included in summary form for the lowest functional systems.

HPMS was developed in 1978 as a continuing database, replacing the special biennial condition studies that had been conducted since 1965. The HPMS has been modified several times since its inception. Changes have been made to reflect changes in the highway systems, legislation, and national priorities, to reflect new technology, and to consolidate or streamline reporting requirements.



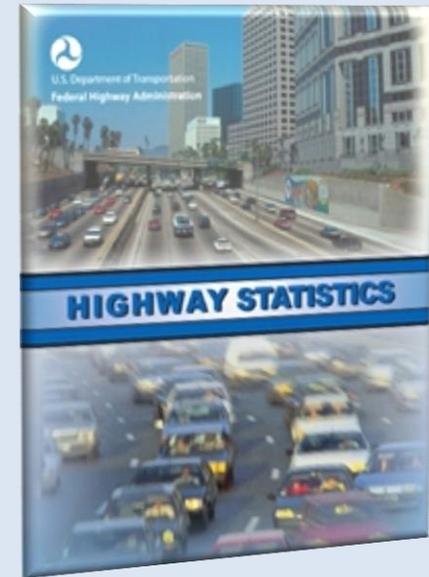
Chapter 3
Table 3.9 Data Items

Item Number	Data Item	Item Number	Data Item	Item Number	Data Item
1	ADT	22	ADCT_Single_Lane	43	Carries
2	ADT_Lane	23	ADCT_Single_Lane	44	Carries_Lane
3	ADT_Lane	24	ADCT_Combination	45	Carries
4	ADT_Lane	25	ADCT_Combination	46	Carries_Lane
5	ADT_Collector	26	ADCT_Collector	47	ADT
6	ADT_Collector	27	ADCT_Collector	48	ADT_Lane
7	ADT_Collector	28	ADCT_Collector	49	ADT_Collector
8	ADT_Collector	29	ADCT_Collector	50	ADT_Collector_Lane
9	ADT_Collector	30	ADCT_Collector	51	ADT_Collector_Carries
10	ADT_Collector	31	ADCT_Collector	52	ADT_Collector_Carries_Lane
11	ADT_Collector	32	ADCT_Collector	53	ADT_Collector_Carries_Carries
12	ADT_Collector	33	ADCT_Collector	54	ADT_Collector_Carries_Carries_Lane
13	ADT_Collector	34	ADCT_Collector	55	ADT_Collector_Carries_Carries_Carries
14	ADT_Collector	35	ADCT_Collector	56	ADT_Collector_Carries_Carries_Carries_Lane
15	ADT_Collector	36	ADCT_Collector	57	ADT_Collector_Carries_Carries_Carries_Carries
16	ADT_Collector	37	ADCT_Collector	58	ADT_Collector_Carries_Carries_Carries_Carries_Lane
17	ADT_Collector	38	ADCT_Collector	59	ADT_Collector_Carries_Carries_Carries_Carries_Carries
18	ADT_Collector	39	ADCT_Collector	60	ADT_Collector_Carries_Carries_Carries_Carries_Carries_Lane
19	ADT_Collector	40	ADCT_Collector	61	ADT_Collector_Carries_Carries_Carries_Carries_Carries_Carries
20	ADT_Collector	41	ADCT_Collector	62	ADT_Collector_Carries_Carries_Carries_Carries_Carries_Carries_Lane
21	ADCT	42	ADCT_Collector	63	ADT_Collector_Carries_Carries_Carries_Carries_Carries_Carries_Carries

The following is an example ADCT record as it would appear in the Sections dataset (in the Sections Catalog):

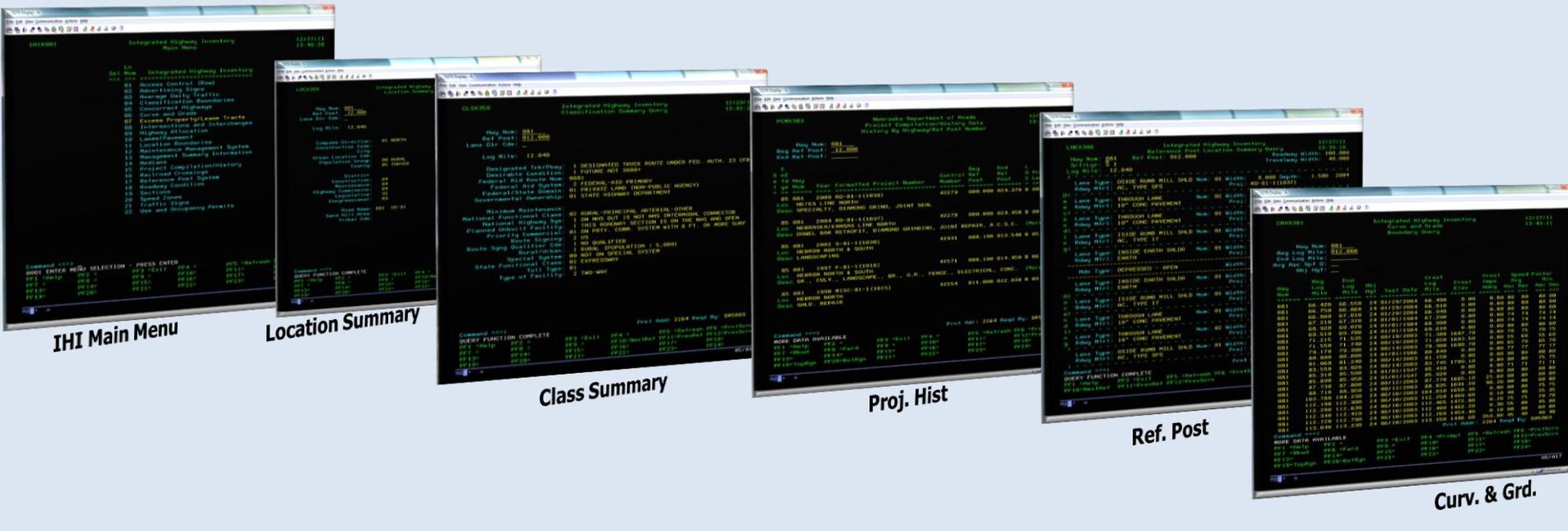
Year	State	Route	Begin Point	End Point	Data Item	Section Length	Value	Value Unit	Value Date	Comments (optional)
2007	22	660090	0	10.5	ADCT	10.5	20000		2007	This record represents the traffic volume ADCT on I-90 for the section extending from milepost 0.0 to milepost 10.5.

U.S. Department of Transportation
Federal Highway Administration

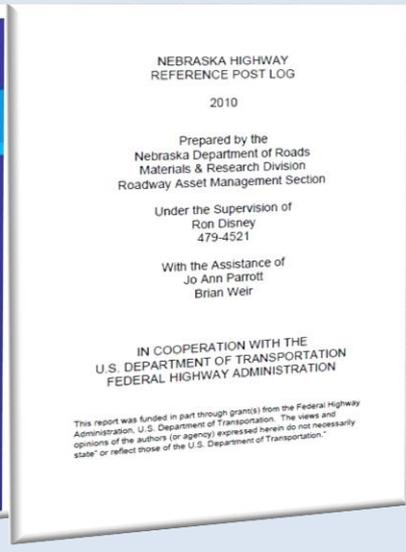
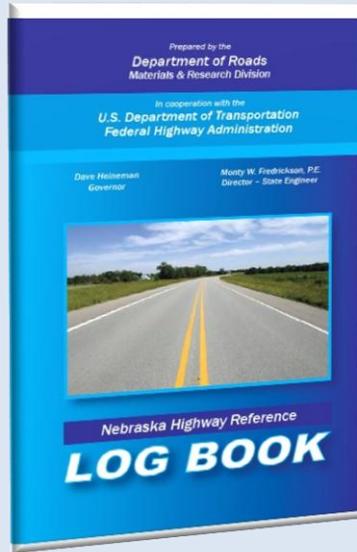


Roadway Data Mgt/Classification & Needs Unit

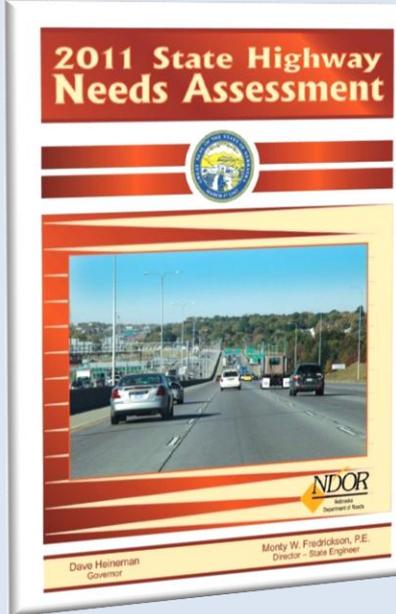
The Roadway Data Mgt / Classification & Needs Unit is responsible for the collection and management of geometric, classification, and location information on the over 96,000 miles of highways, county roads, and city streets in Nebraska. Inventory personnel examine roads to gather the GPS information, roadway length, geometrics, and culture information. Information supplied by the inventory personnel along with information gathered from roadway construction plans and information from local officials is analyzed by the statistics personnel. This information is then used to populate tables in the Integrated Highway Inventory System (IHI) on the mainframe.



Roadway Data Mgt/Classification & Needs Unit



The data within the IHI is used in, creating the Highway Reference Post Log Book, the determination of the 20 year needs, District allocations, the Highway Performance Monitoring System (HPMS), reporting the State's certified miles the Federal Highway Administration (FHWA), the Pavement Optimization Program, along with many reports requested of the unit.



Needs Assessment Criteria

The needs assessment criteria to identify non-interventive roadway geometric deficiencies are grouped into six Average Daily Traffic (ADT) categories as listed:

Future ADT	Minimum Roadway Width
36,000 & greater (see State warrants!)	60' wide
10,000 - 36,000 (State warrants required)	50' wide
4,000 - 9,999	30' wide
2,000 - 3,999	20' wide
Under 2,000	20' wide

Bridges
Bridges needs are identified using the current and proposed bridge stress data available in the Nebraska Bridge Inventory System. Survey information, and engineering records are analyzed in the data used to identify bridge deficiencies. Bridges may be used in place of some nearby roads. Such bridges are identified using the Bridge Management System.

Future ADT
36,000 & greater: 60' wide
10,000 - 9,999: 50' wide
4,000 - 3,999: 30' wide
2,000 - 1,999: 20' wide
Under 2,000: 20' wide

Summary of Needs

	2010	2011
Pavement Restoration	\$5,883,000,000	\$6,796,041,000
Bridge Replacements	2,890,646,000	3,670,000,000
Urban	345,798,000	368,004,000
Roadway Drainage	229,600,000	173,800,000
Minority River Bridges	62,898,000	0
Maintenance	293,313,000	293,216,000
Total	\$9,295,256,000	\$11,147,051,000

Roadway Data Mgt/Classification & Needs Unit

LEGEND

NATIONAL FUNCTIONAL CLASSIFICATION:

- INTERSTATE.....
- OTHER RURAL PRINCIPAL ARTERIALS.....
- RURAL MINOR ARTERIALS.....
- RURAL MAJOR COLLECTORS(STATE).....
- (COUNTY).....
- RURAL MINOR COLLECTORS.....

All Roads Not Otherwise Indicated Are Classified As Local



The unit is responsible for the functional classification of all public roads within the State. This is done on both the National and State Classification Systems. Managing the designation of the National Highway System and the Priority Commercial System is also the responsibility of the unit.

LEGEND

STATE FUNCTIONAL CLASSIFICATION:

- INTERSTATE.....
- EXPRESSWAY.....
- MAJOR ARTERIAL.....
- OTHER ARTERIAL.....
- COLLECTOR.....
- MINIMUM MAINTENANCE.....

All Roads Not Otherwise Indicated Are Classified As Local





[Mat/Research](#)

[Construction](#)

[Districts](#)

[I H I](#)

[Aerials](#)

[Pilot Apps](#)

Welcome to the **NDOR**

Business Technology Support Division GIS Section

NECTAR Web Application

Mouse-over the menu buttons for available data

Requires active CGM plug-in; You must be an administrator to install

Please contact your Tech Support Person if Map does not display

Best viewed at 1280 x 1024 Screen Resolution



[NECTAR Home](#)

[Bookmark this Site!](#)

[NDOR Home](#)

[Comments/Questions](#)

[Ref Post Log Bk](#)

[PathWeb](#)

[511 Web](#)

[DIRK](#)

NECTAR (Nebraska Enterprise Centerline Transportation Attribute Resource) is a web-based Geographic Information Systems (GIS) tool that has been developed to provide employees of NDOR including the Districts with user friendly access to current transportation related information. It allows the user to query multiple databases to create maps pertaining to a wide variety of transportation categories as our examples show. DRG's and current aerial photos can be used as backdrops to the maps you create. NECTAR has links to the Log Book, PathWeb and 511 Web.

GIS/Mapping Unit



GIS/Mapping Unit

TRAFFIC ENGINEERING - JUNCTION SIGNING AREA



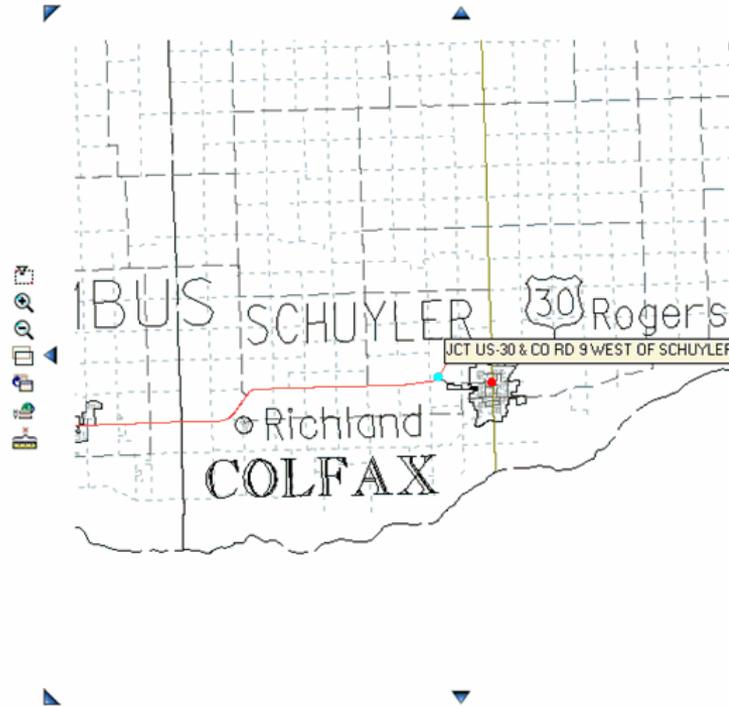
- Matl/Research
- Construction
- Districts
- I H I
- Aerials
- Pilot Apps

Traffic Engineering Junction Signing Plans

Spatial Area:

District:

Backgrounds:
 * Will not appear until view is in to approx. 4 mi. x 4 mi.
 None
 DRG
 DOQQ
 Farm Services
 DEM

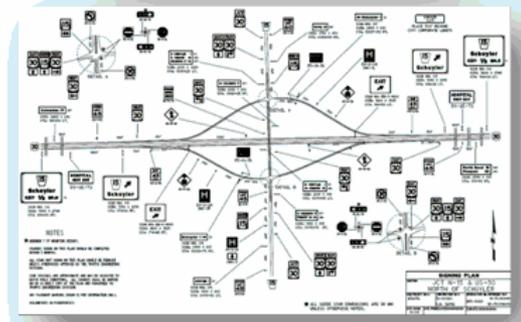


- Legend**
- Junction
 - US Highways
 - State Routes
 - Local Arterials and Collectors
 - Local Roads

Junction	JCT N-15 & US-30 NORTH OF SCHUYLER
Location	North of Schuyler
Intersection No.	19051
Route 1	030
Route 1 Ref Post	395.55
Route 2	015
Route 2 Ref Post	109.49
County	Colfax
District Number	3
Maintenance Headquarters	Columbus
Project Number	30-6(126)

[Click here to view the Junction Signing Plan in PDF Format](#)

Click the routes below to view in PathWeb
[Route 1](#)
[Route 2](#)



- [NECTAR Home](#)
- [Bookmark this Site!](#)
- [NDOR Home](#)
- [Comments/Questions](#)
- Ref Post Log Bk
- PathWeb
- 511 Web
- DIRK

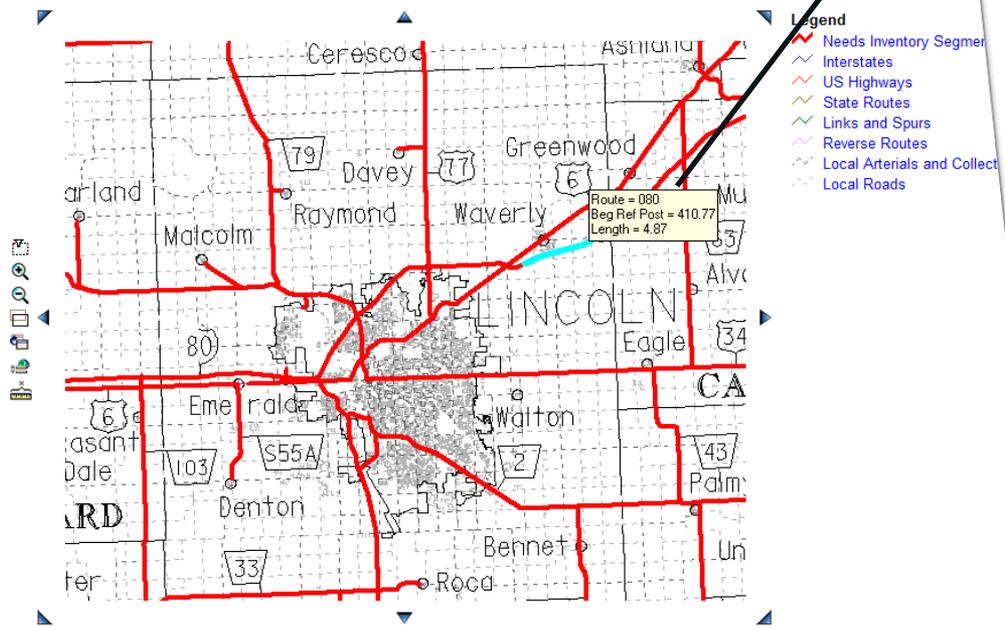


MATERIALS & RESEARCH- NEEDS INVENTORY

[Matl/Research](#)
[Construction](#)
[Districts](#)
[I H I](#)
[Aerials](#)
[Pilot Apps](#)

Materials & Research Needs Inventory
 Highway: All
 Spatial Area: NDOR Districts
 District: 1
 Optional Data:
 Bridges: None
 Railroad Crossings: None
 ADT's: None
 Crash Locations: None
 Secondary Output Data:
 * Click on Feature
 Report (Current Record)
 Report (Current Record Plus Next 5 Records)
 PathWeb (State Hwy Fea.)
 Log Book
 Backgrounds:
 * Will not appear until view is in to approx. 4 mi. x 4 mi.
 None
 DRG
 DOQQ
 Farm Services
 DEM

[NECTAR Home](#)
[Bookmark this Site!](#)
[NDOR Home](#)
[Comments/Questions](#)
[Ref Post Log Bk](#)
[PathWeb](#)
[511 Web](#)
[DIRK](#)



Needs Inventory Report

Highway Number:	080
Beginning Reference Post:	410.77
Length:	4.87
Direction:	Ascending
Lanes:	3
Area Type:	Interstate
Classification:	
National:	Interstate
State:	Interstate
Priority Commercial System:	
Construction District:	1
Average Daily Traffic:	
Present:	19367
Future:	33893
Percent of Trucks:	19
Surfacing:	
Latest Resurfacing / Reconstruction:	2009
Type:	PCC
Width:	36
Surface Condition:	
Date Tested NSI:	10/4/2010
Date Tested IRI:	0
NSI (Nebraska Serviceability Index):	1.38
IRI (Roughness in mm/m):	0
PSI (Ride Quality):	0
Cracking Ind Bit / % Cracking PCC:	0
No. of TC or % Bad Joints/Mile:	0
Rutting (average in mm):	0
Faulting (average in mm):	0
Shoulder:	



MATERIALS & RESEARCH- OPTIMUM REHABILITATION YEAR

Materials & Research
Optimum Rehabilitation Year

Opt Rehab Year: 2012

Spatial Area: NDOR Districts

District: 1

Optional Data:
Bridges: All
Railroad Crossings: All
ADTs: None
Crash Locations: All

Secondary Output Data:
* Click on Feature
 Report
 PathWeb (State Hwy Fea.)
 Log Book

Backgrounds:
* Will not appear until view is in to approx. 4 mi. x 4 mi.
 None
 DRG
 DOQQ
 Farm Services
 DEM

[CREATE MAP](#)

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[Ref Post Log Bk](#) [PathWeb](#) [511 Web](#) [DIRK](#)

Legend

- 2012
- Interstates
- US Highways
- State Routes
- Links and Spurs
- Local Arterials and Collectors
- Local Roads
- State Bridges
- Local Bridges
- State Crossings
- Local Crossings
- Fatal Crashes

CURRENT DIVISION CURRENT CONSTRUCTION PROJECTS

Construction Division
Current Construction Projects

Current Projects: All

Spatial Area: NDOR Districts

District: 2

Optional Data:
Bridges: None
Railroad Crossings: None
ADTs: None
Crash Locations: None

Secondary Output Data:
* Click on Feature
 Report
 PathWeb (State Hwy Fea.)
 Log Book

Backgrounds:
* Will not appear until view is in to approx. 4 mi. x 4 mi.
 None
 DRG
 DOQQ
 Farm Services
 DEM

[CREATE MAP](#)

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[Ref Post Log Bk](#) [PathWeb](#) [511 Web](#) [DIRK](#)

Legend

- Current Construction Projects
- Interstates
- US Highways
- State Routes
- Links and Spurs
- Reverse Routes
- Local Arterials and Collectors
- Local Roads

DISTRICTS-NGS CONTROL

Districts
NGS Control

Control: All

County: Adams - 1

Backgrounds:
* Will not appear until view is in to approx. 4 mi. x 4 mi.
 None
 DRG
 DOQQ
 Farm Services
 DEM

[CREATE MAP](#)

[NECTAR Home](#) [Bookmark this Site!](#) [NDOR Home](#) [Comments/Questions](#)

[Ref Post Log Bk](#) [PathWeb](#) [511 Web](#) [DIRK](#)

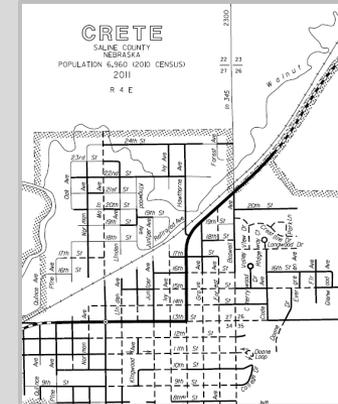
Legend

- GPS
- Horizontal Control
- Vertical Control
- Interstates
- US Highways
- State Routes
- Links and Spurs
- Local Arterials and Collectors
- Local Roads

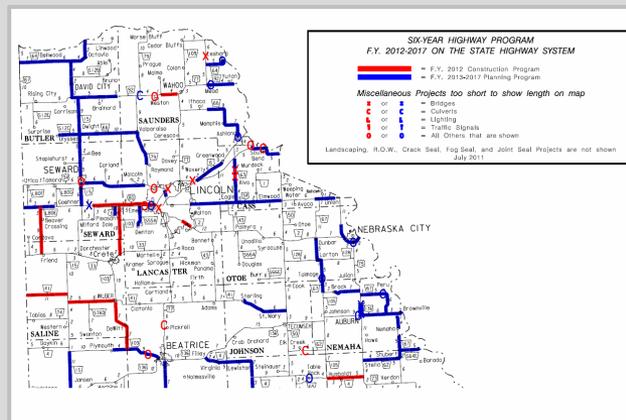
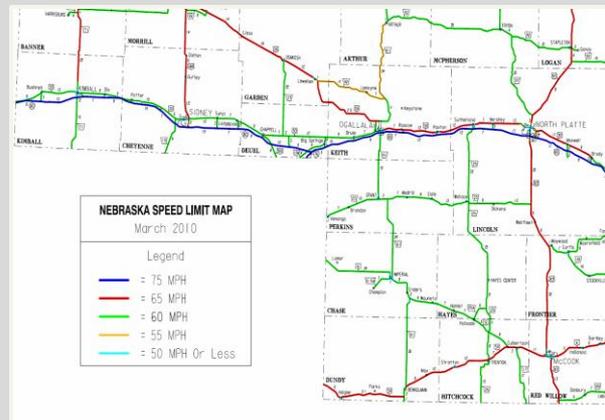
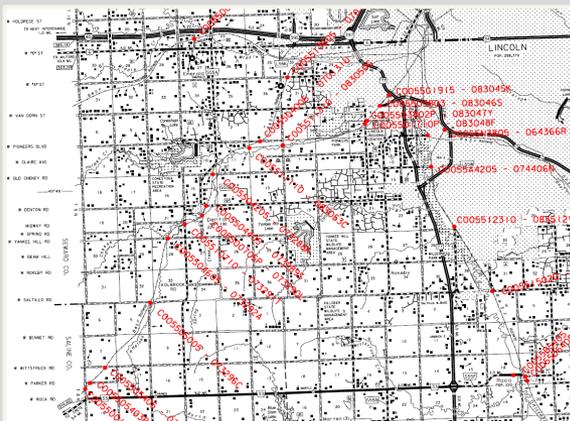
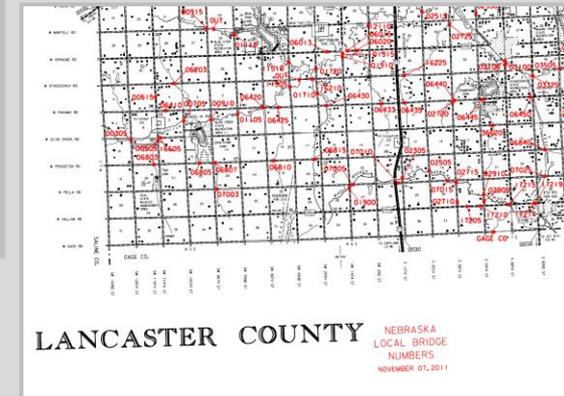
GIS/Mapping Unit

Menu Aided Display of Digital Maps (MADDOG)

or GIS Products

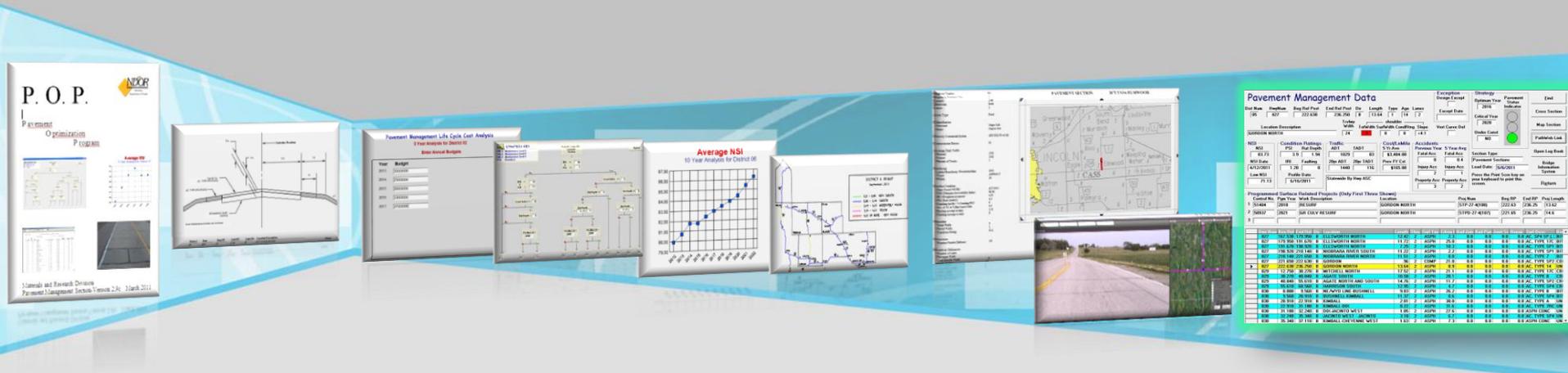


MADDOG (Menu Aided Display of Digital Maps or GIS Products) is a tool originally created for the Director's office to allow them access to a wide variety of maps without requiring them to know where the files are located or how to use the software. MADDOG provides access to NDOR microstation users to Functional Classification, County, City, District maps as well as maps with bridge locations, maps with railroad crossings, Program maps, Maintenance Yard maps, the Railroad map, Traffic Flow Map and many others.



Pavement Optimization Program (POP)

This program is a one-stop-shop for Highway related data. It allows you to investigate your current pavement ratings, create a map of the section, create a cross section diagram, link to our log book, link to the bridge information system and to the Pathweb browser for viewing the roadway photos with GPS capabilities. It also has a life cycle cost analysis which prompts you to enter an analysis period and annual budgets. A yearly output report shows those selected sections that would be improved based on the budget and the benefit cost ratio. This is used to create the annual resurfacing candidate listings and the district budget allocations.

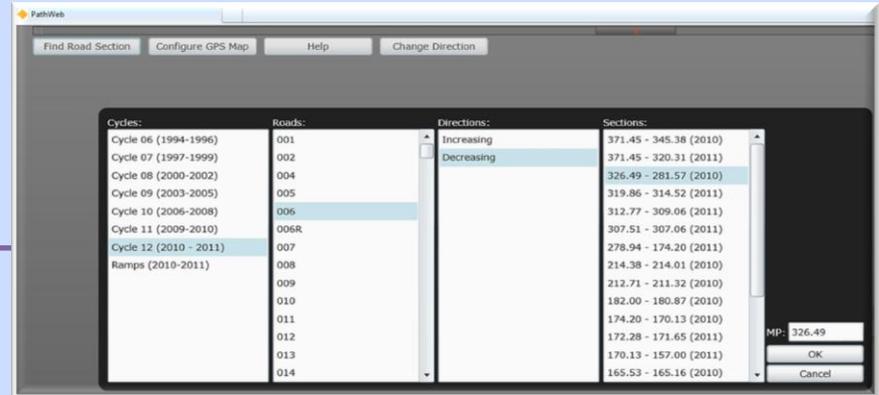


Analysis/Reports & Listings
POP & PathWeb



PathWeb

Find Feature



Pathweb provides the user with the perspective views of the roadway every 25 feet as well as downward photos every 5 feet on an annual basis. Historical photos from the Mandli system are available from 1994 to 2008. There is also an option to turn on an IRI(roughness) graph and a transverse profile graph of the roadway. The GIS mapping tool has options to show rutting or IRI with color coded ranges. Customized kml files can also be added to show data on the map.



IRI Condition

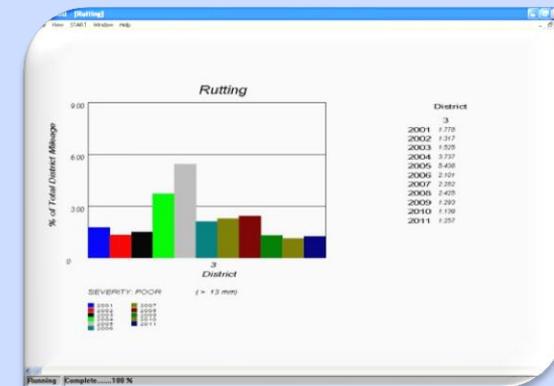
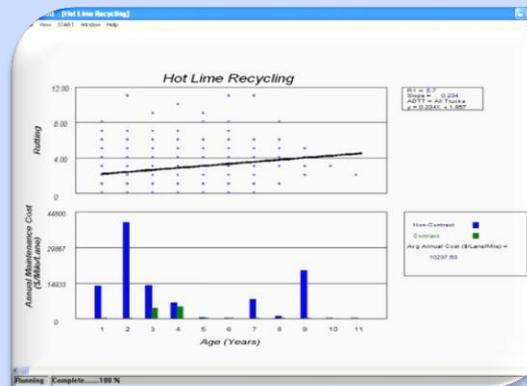
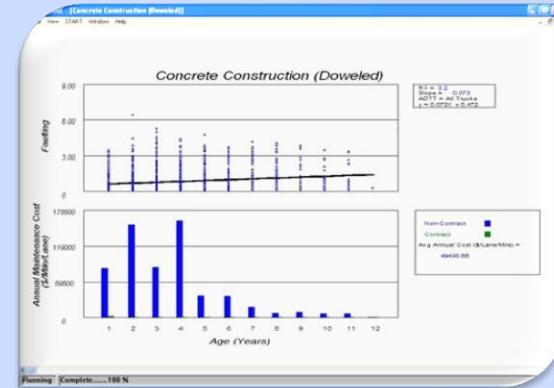
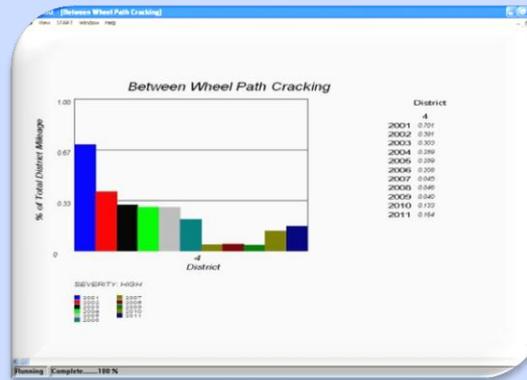


**Analysis/Reports & Listings
POP & PathWeb**

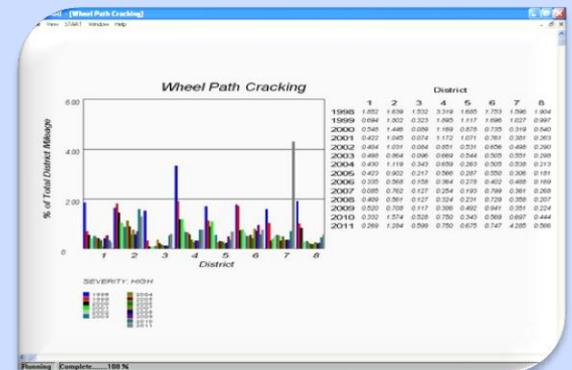
This program allows you to look at current pavement conditions and track the effectiveness of rehabilitation strategies. The Condition Assessment looks at the detailed rating data and gives you summarized graphs for distresses for either flexible or rigid pavement. The Rehabilitation Effectiveness tracks distresses and maintenance costs on seven pre-selected rehabilitation strategies. A trend line is graphed for the life of each strategy. These are the strategies being tracked:

- Concrete Construction(Non-Doweled)
- Concrete Construction(Doweled)
- Dowel Bar Retrofit
- Fly Ash Recycling
- Hot Lime Recycling
- SP5 Asphalt
- Thin Lift Overlays (< 2.5 in.)

These resulting deteriorating rates for these strategies are then used in POP's life cycle cost analysis and the pavement management database.



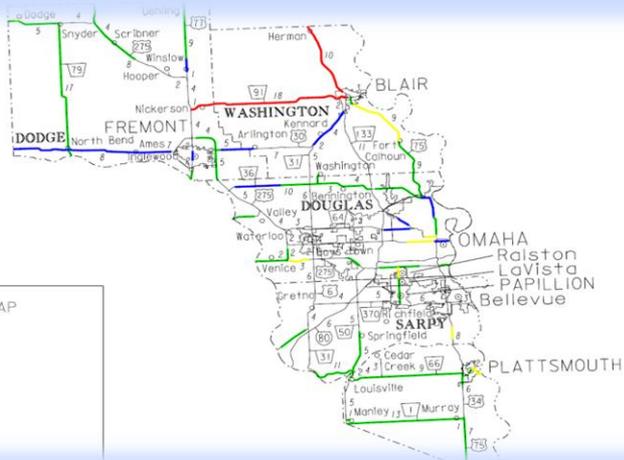
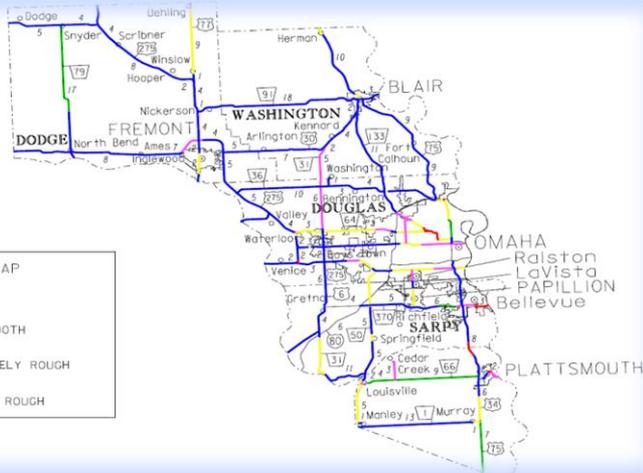
Analysis/Reports & Listings POP & PathWeb



Analysis/Reports & Listings

POP & PathWeb

Annual maps/reports are provided to the Districts to show the condition of their systems and also the candidates for improvements based on POP's life cycle cost analysis.



NOTE: Programmed projects marked with an "X"
Include maintenance projects, (Example-armor coats, chip seals, milling, fog seals, joint and crack seals etc...)