# 10 Critical Steps for

# Effective Pavement Management

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StreetSaver®

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Retired

StreetSaver®
Keeping good roads good!

# Part 1

1. Audit PMP database
2. Network segmentation
3. Conduct periodic network rating
4. Perform QA/QC
5. Hire MTC Certified Consultants

# Part 2

- 6. Update Unit Costs
- 7. Update Decision Trees
- 8. Update M&R records
- 9. Ensure M&R Entered is the Correct Treatment Applied
- 10. Communicate Results with Elected Officials/ Upper Management

# Part 3

- StreetSaver® Demo
- Development Update

# Basic Network-Level PMP Components

1. Inventory
2. Condition Assessment
3. Needs Analysis
4. Prioritization
5. Impact Of Funding Decisions
6. Feedback

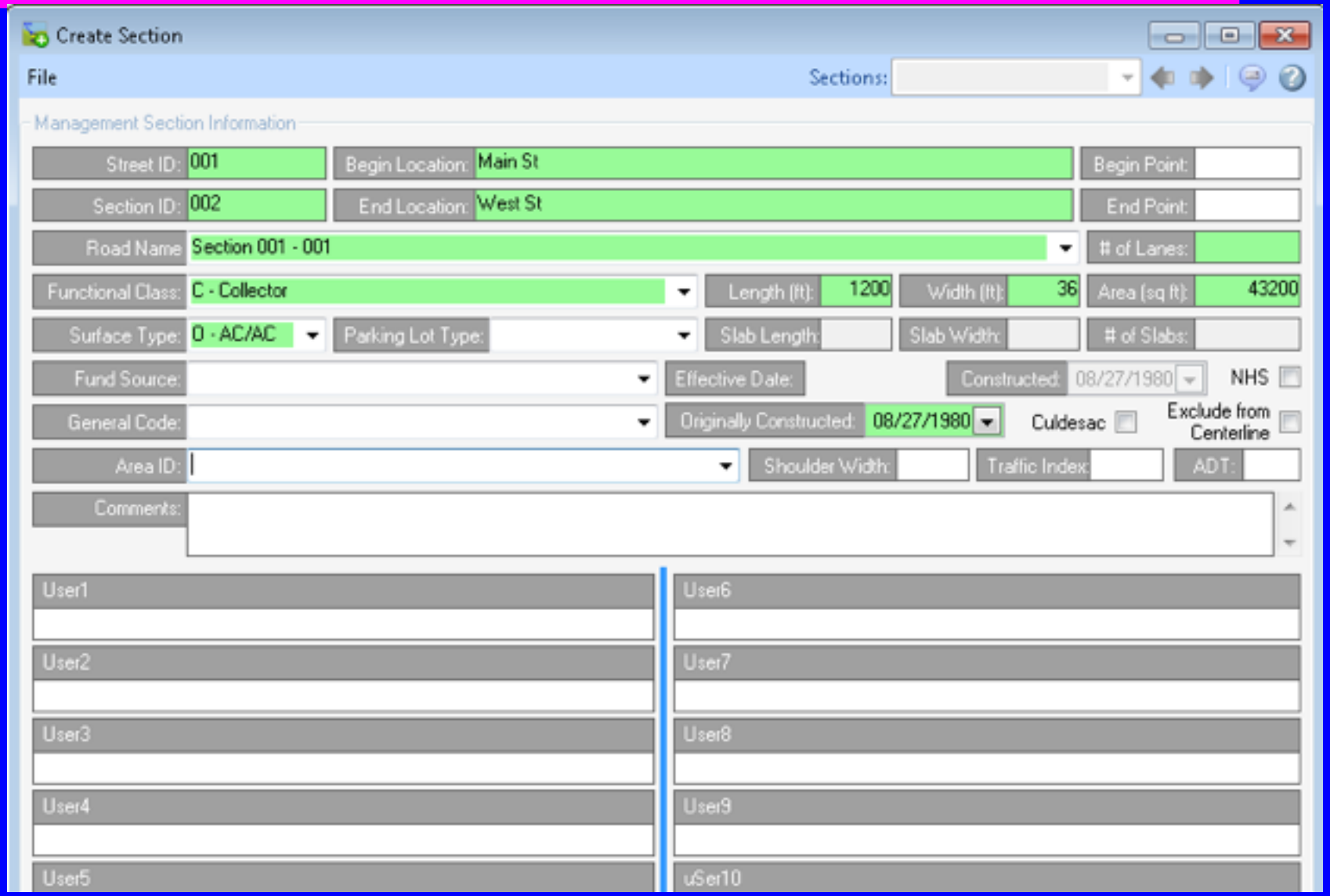
# Inventory

- Defines What Is Being Managed
- Requires that Network be Divided Into Management Units

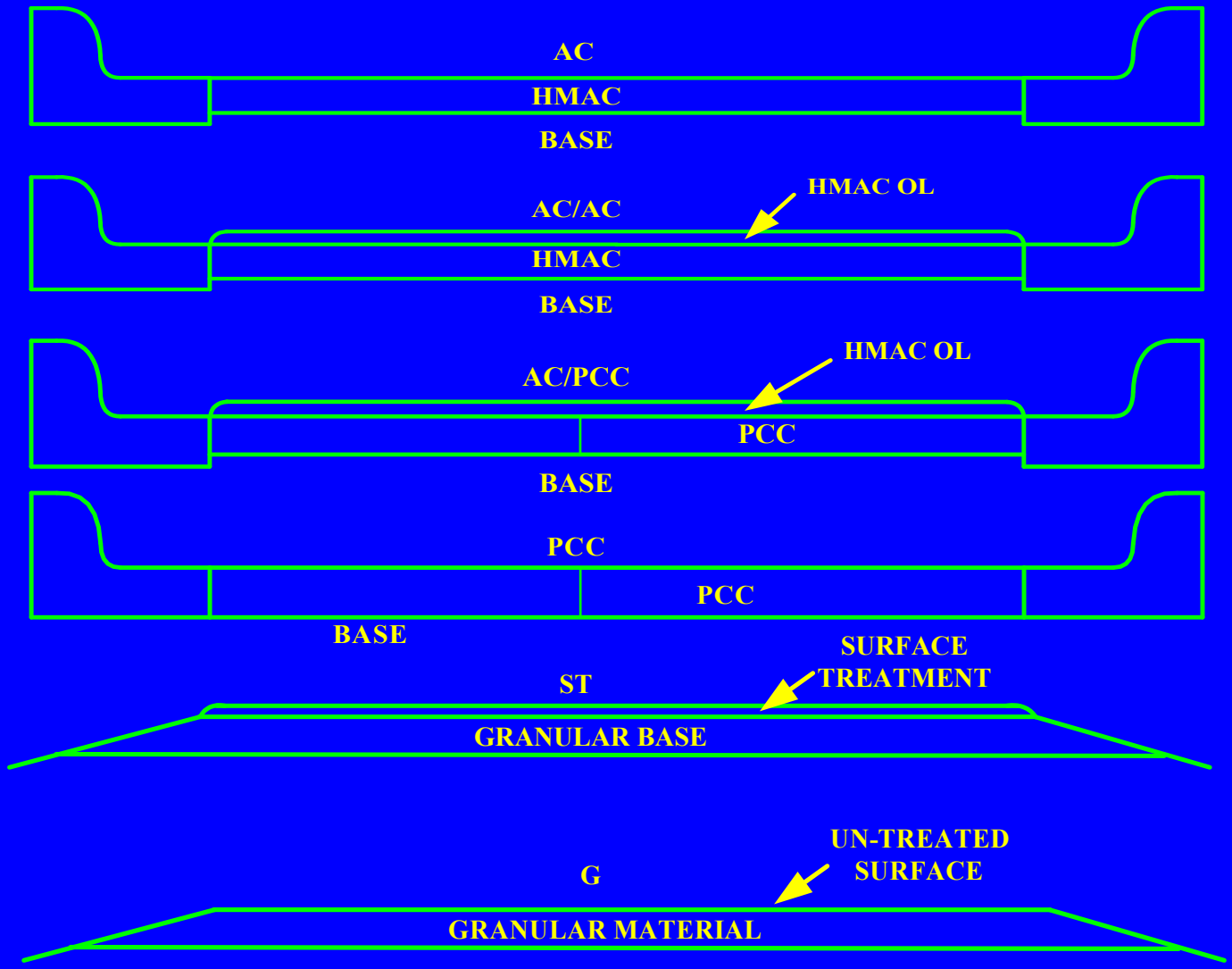
# Basic Information for Each Section

- Identification
- Begin - End
- Surface Type
- Date Construction (Last Surface)
- Functional Class
- Area (Length & Width)

# Required: St ID, Sec ID, Name (Select fm Drop Down), Begin, End, Date Constructed, Area, # Lanes, FC, ST



# Surface Types - ST

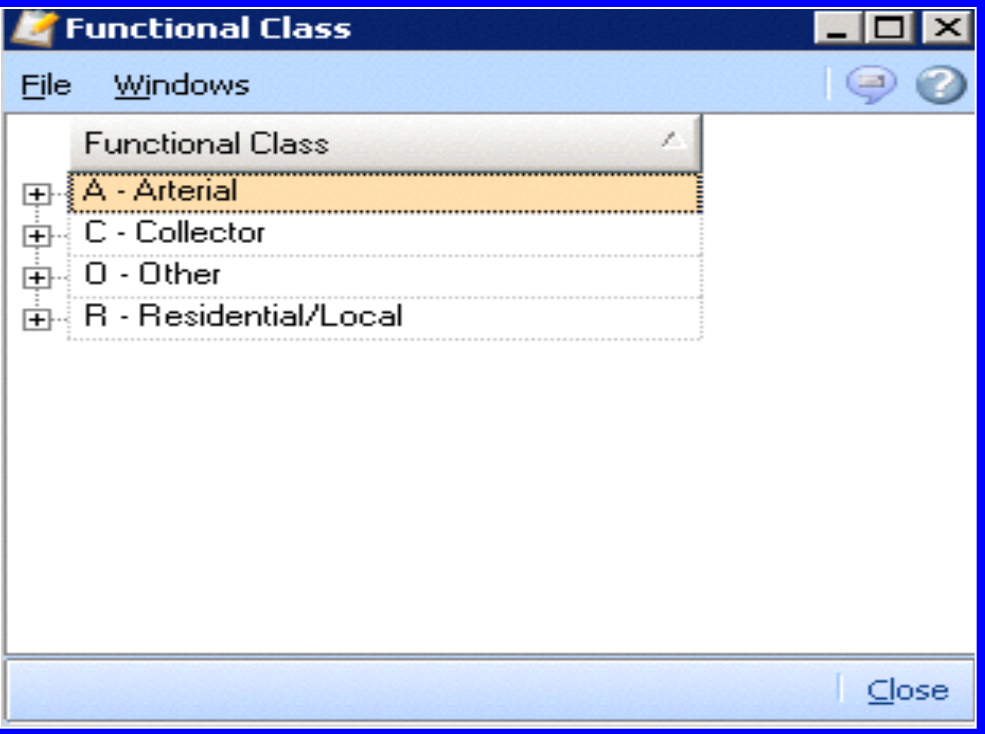


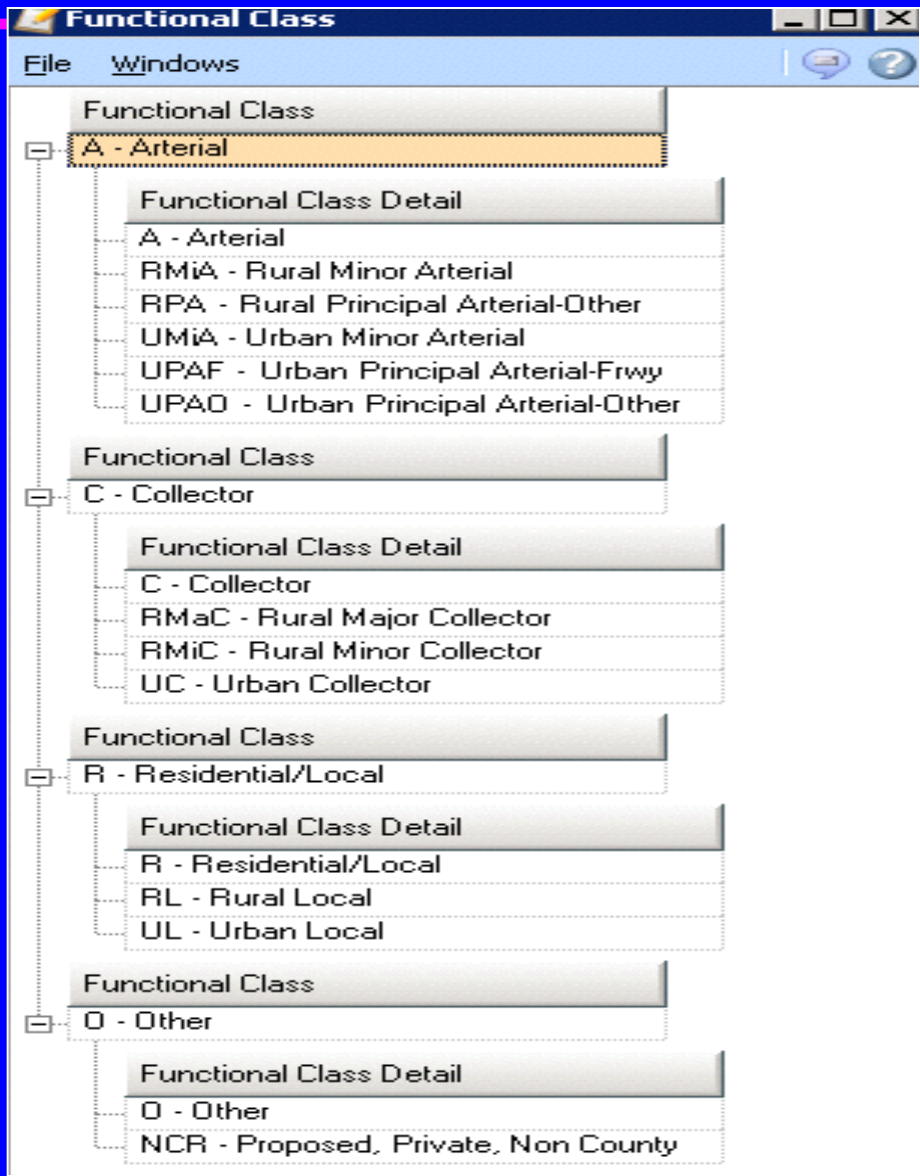
# Functional Class

- Arterial
- Collector
- Residential/Local
- Other

- More Detailed Functional Class Still Use These in Analysis

# Functional Class

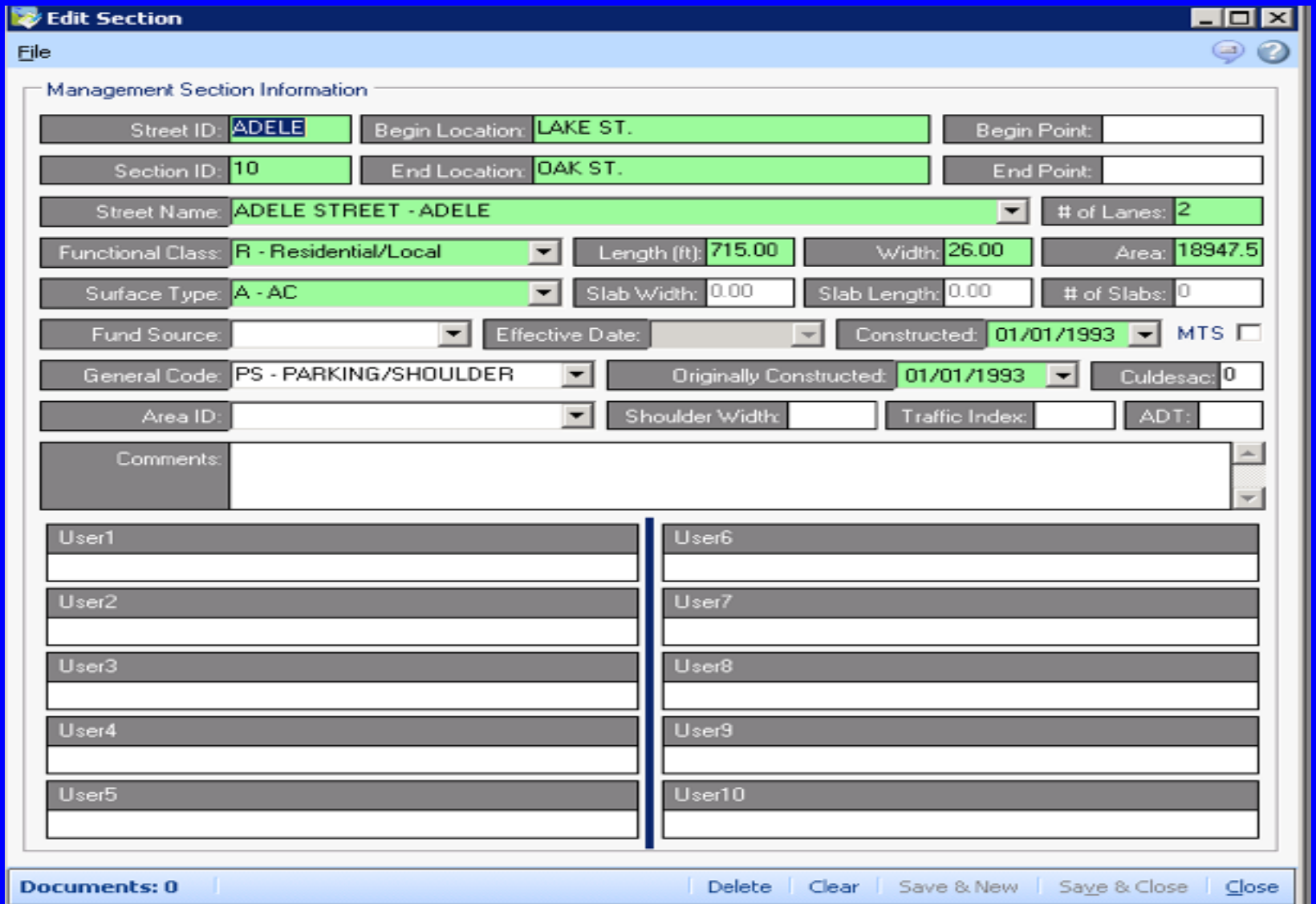


# Other Information and Sort Codes

- ADT
- TI
- Area ID
- Funding Code
- General Code
- User Defined

# Optional Data
# Once Entered, Pull from Menu



# Update For Work Completed

- Computer Does Not Know Work Completed Until Data Entered
- Will Recommend Work on Wrong Projects Unless Data Updated

# Data Audit

- Many of us are using data developed and entered over a number of years by different agency and consultant personnel

- When was the last time that data was checked for accuracy

# Data Audit

- Common incorrect section information
  - Length & width – check against GIS map
  - Functional Class – check against FHWA Functional Classification Map
  - Surface Type
  - M&R Treatments recorded
- Incorrect information can lead to loss of federal funds

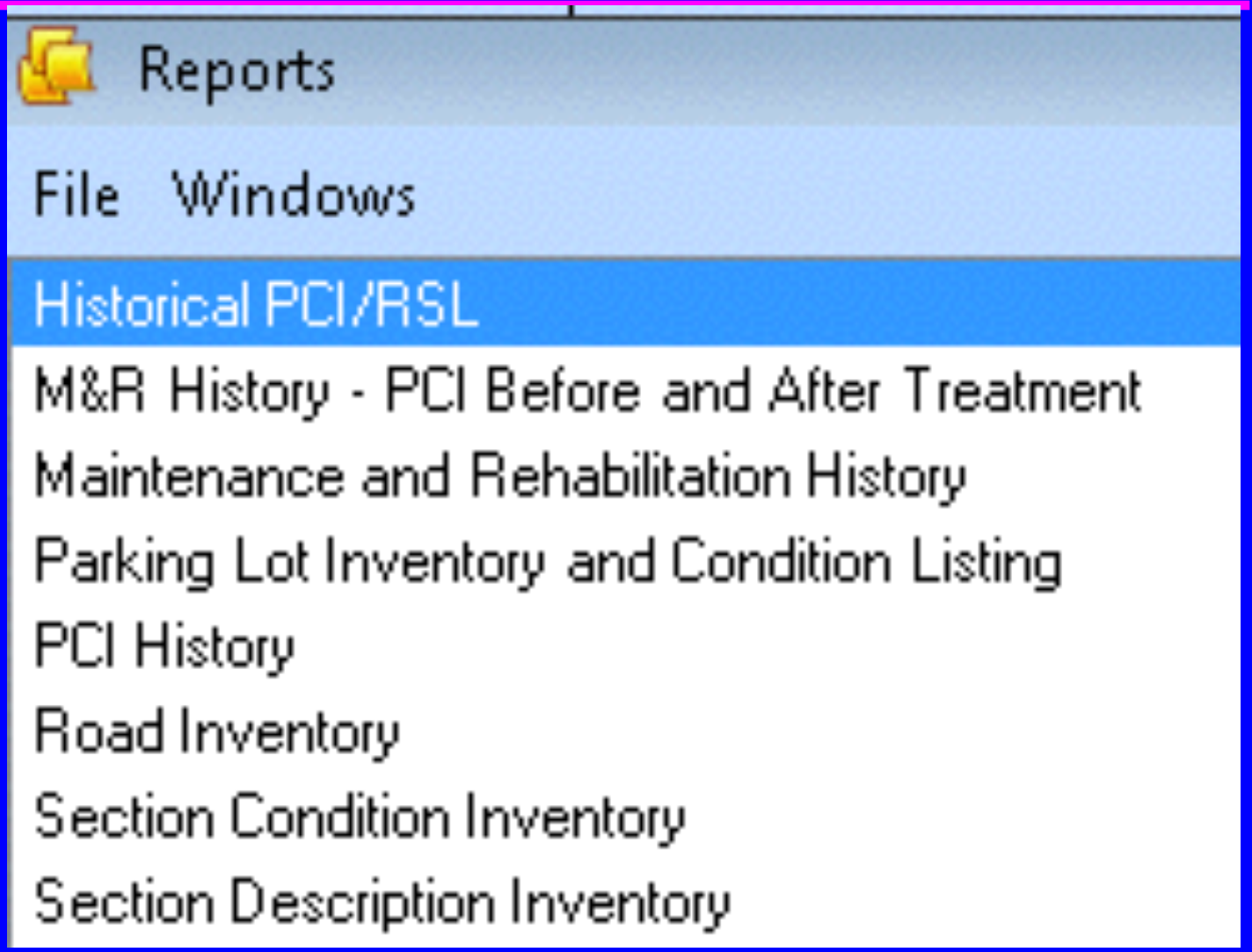
# Reports Provide Access to Information Entered

- Series of General Reports
- Custom Report Writer

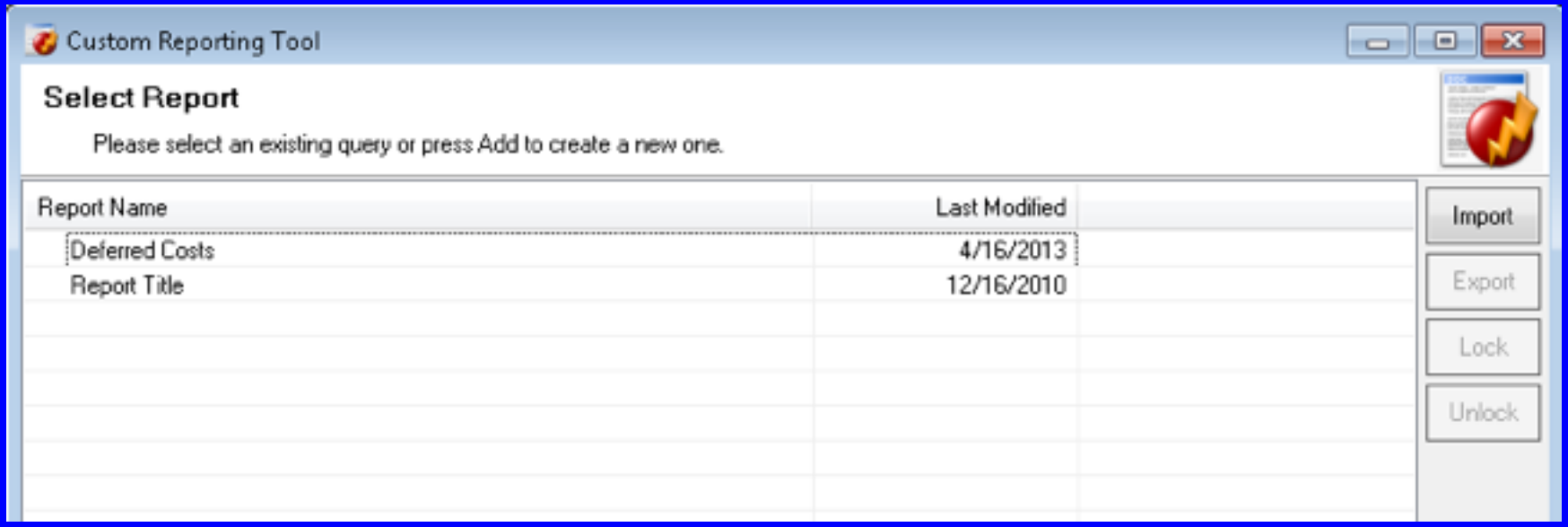
# Reports


StreetSaver®
Pavement Sections
GIS Toolbox
Table Maintenance
Inspections
Budgeting
Reporting
Maintenance Treatments
Asset Management
Reporting
Custom Reporting Tool
Custom Report Fields
Reports
Graphs

# Reports


Reports
File Windows
Historical PCI/RSL
M&R History - PCI Before and After Treatment
Maintenance and Rehabilitation History
Parking Lot Inventory and Condition Listing
PCI History
Road Inventory
Section Condition Inventory
Section Description Inventory

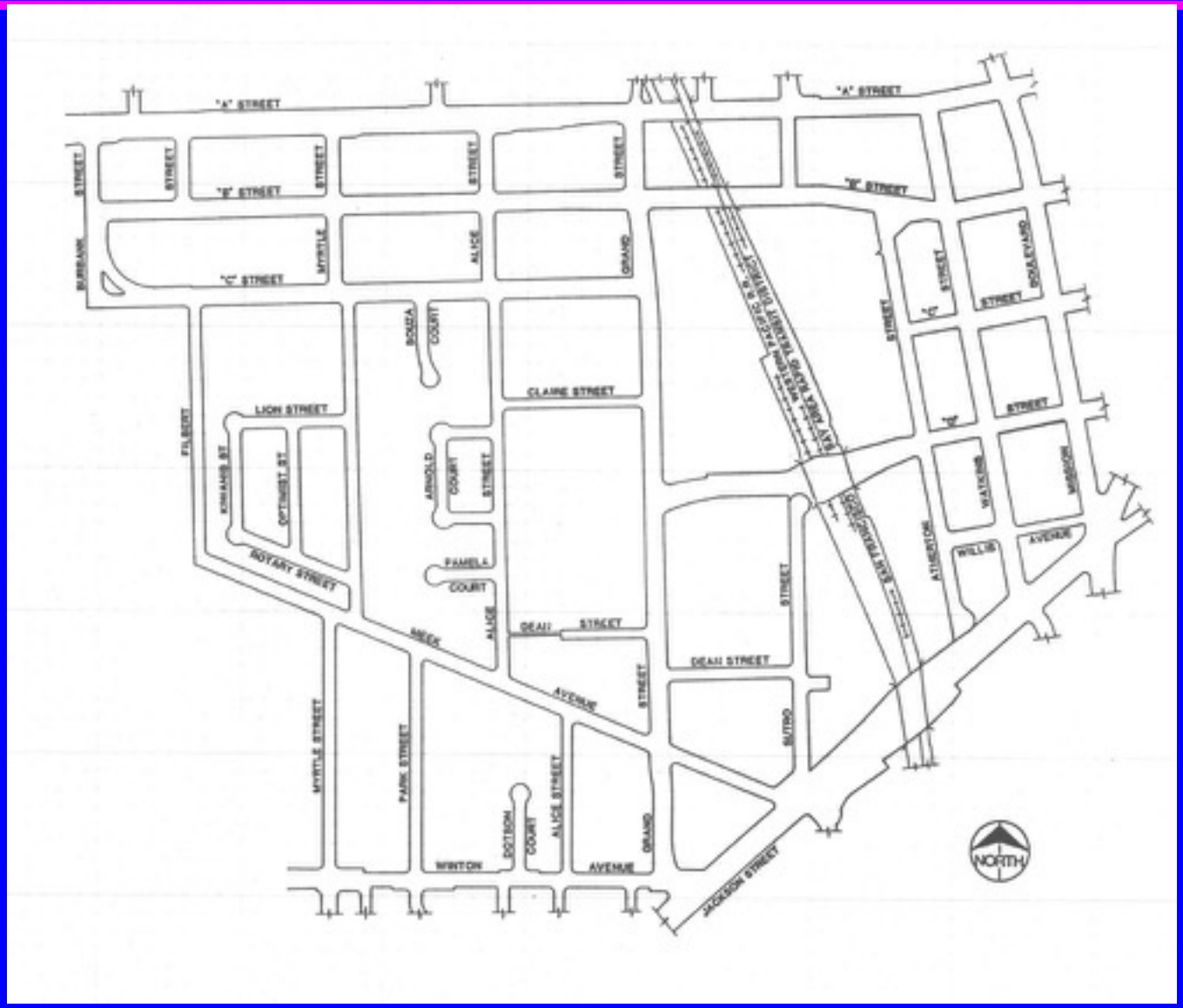
# Custom Reporting Tool



# Management Section

- Subdividing Network
- Can Only Have One of Each Basic Data Item
  - FC, ST, Sect Width, etc.
- Basic Decision
  - Would I Treat This Section As a Single Unit When Planning Work?

# Dividing Network into Management Sections Segmentation)

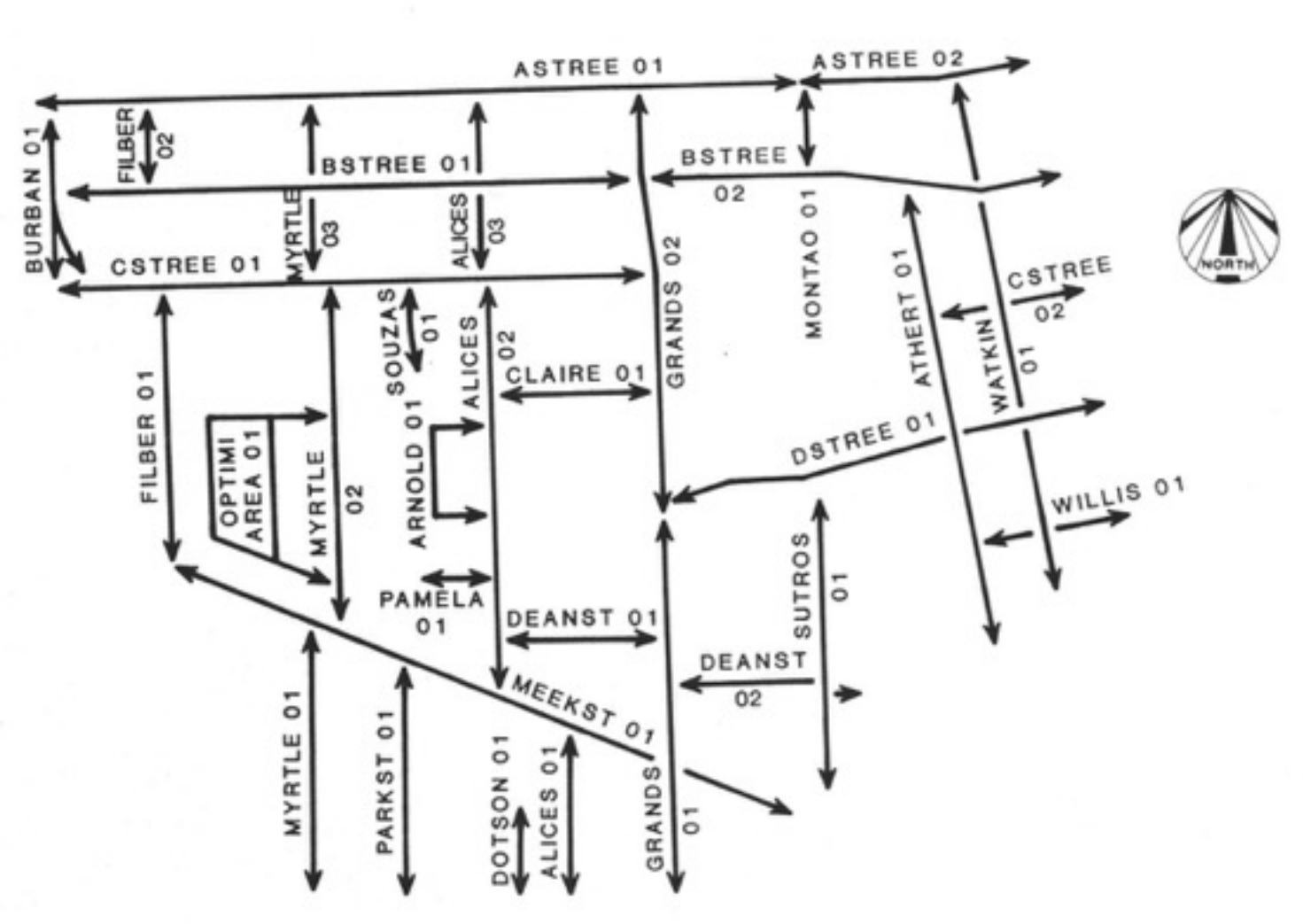


# Subdivision Methods

- Intersection
- Mile Marker
- Standard Length (Block Face)
- Lane
- Combination

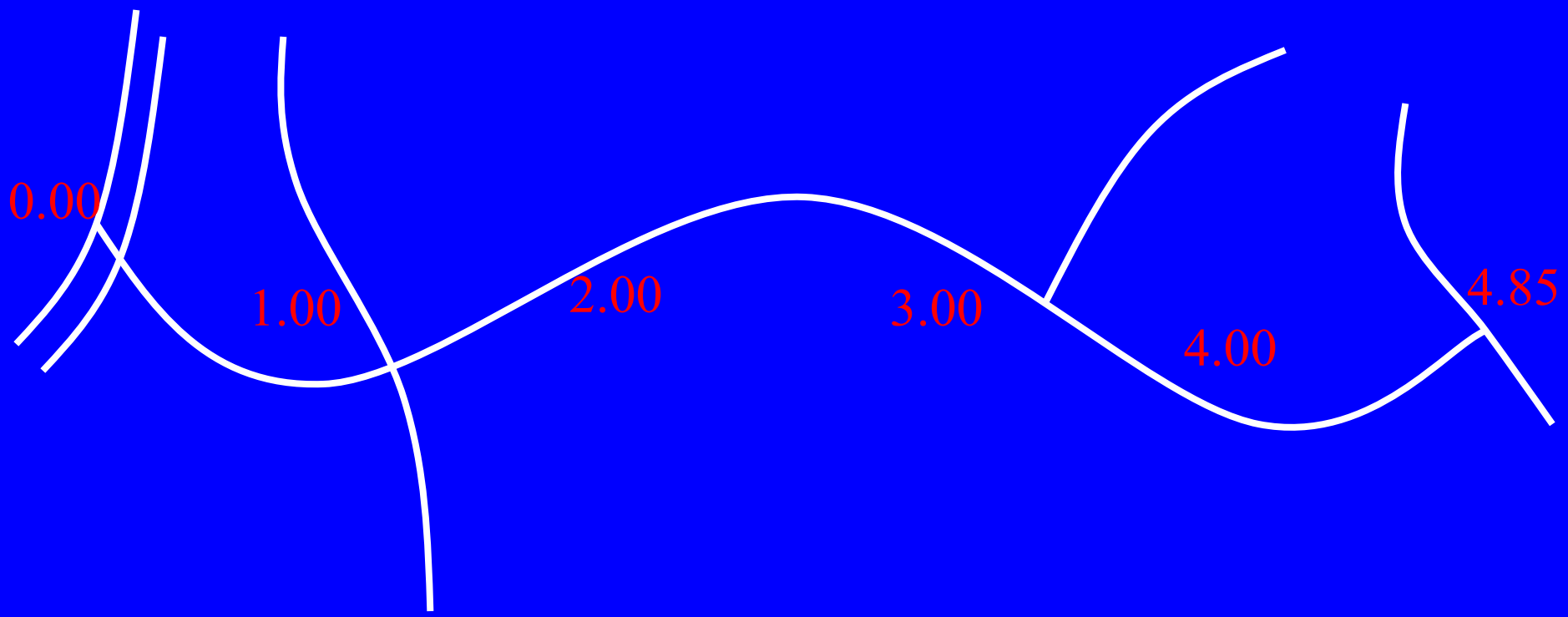
# Intersection Method

From one intersection to another (not necessarily the next one)



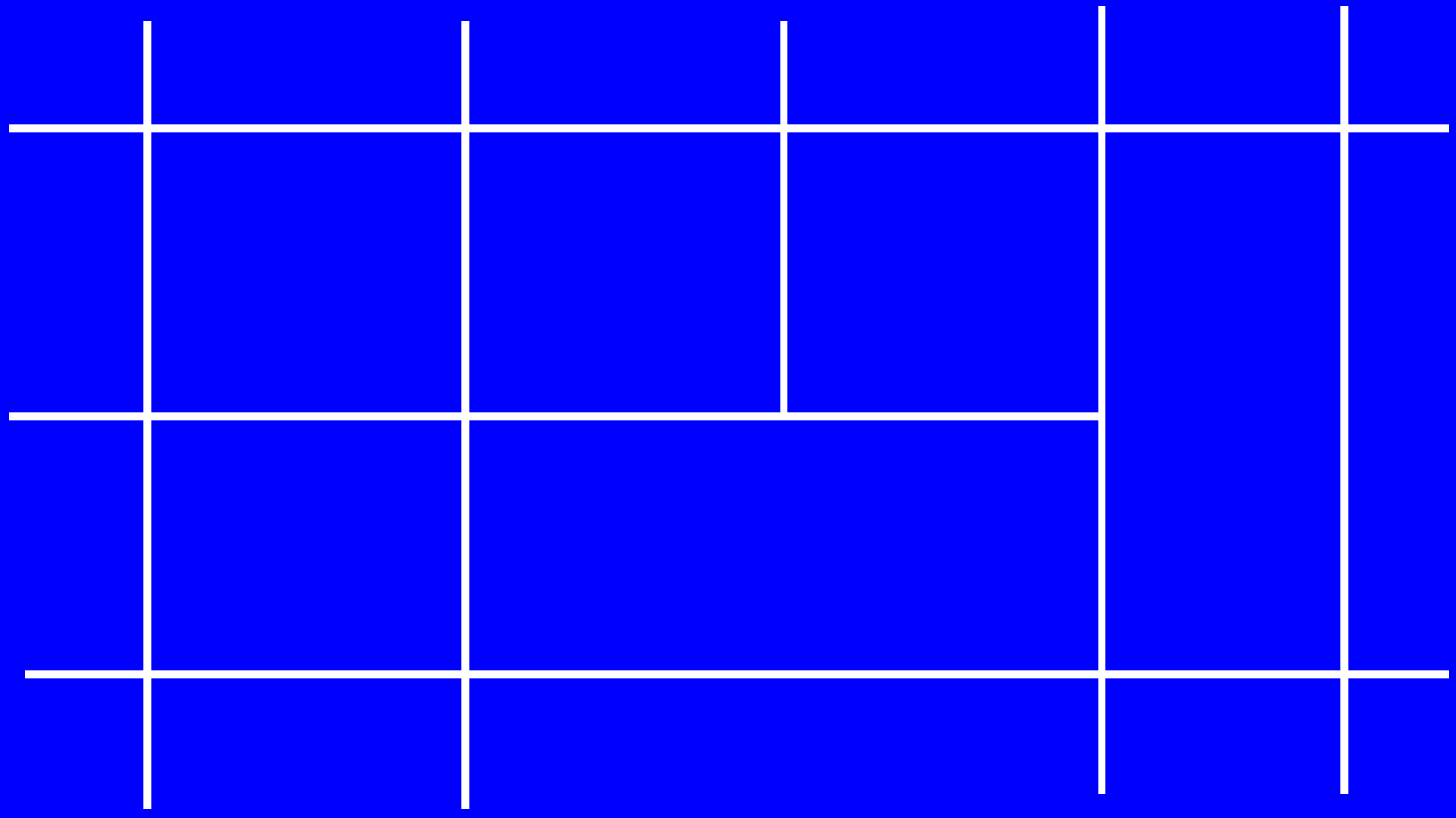
# Mile Marker - County Roads

From one mile-marker to another (not necessarily the next one)



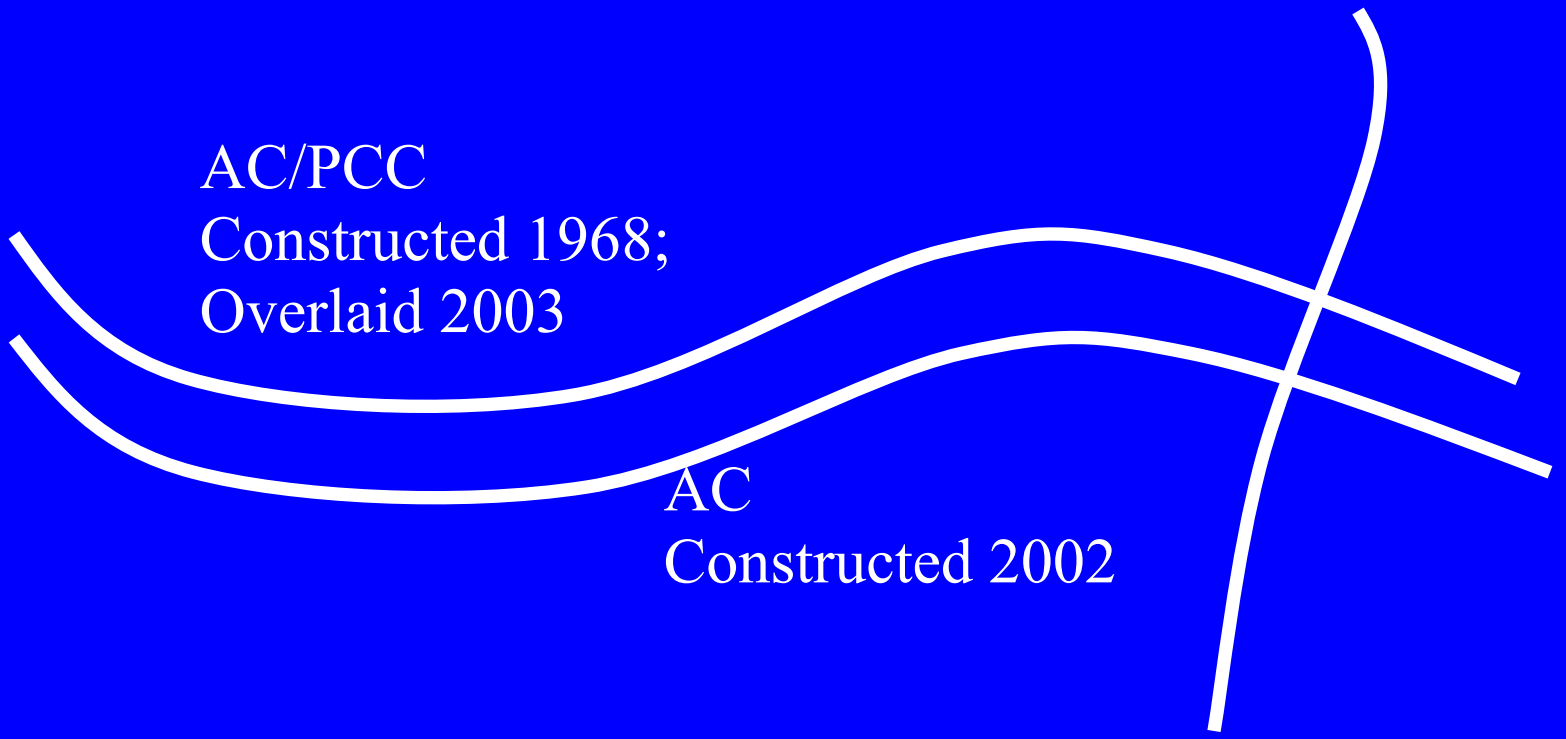
# Standard Length

## Block Face (Length may not always be equal)



# Lane

## Eastbound section 10e, westbound section 10w



# Section Size Guidelines

- Not so large that it cannot be funded
- Not so small that it will not be considered alone

# Small Sections

- More likely to be uniform
- Increases inspection area
- Increases number of sections in database and database size
- Increases database processing time (section number dependent)
- Increases subsequent analysis by agency
- Often combined with adjacent sections for treatment

# Large Sections

- More likely to be non-uniform
- Deceases database size & processing time
- May require later sub-division
- Less than whole section may be treated

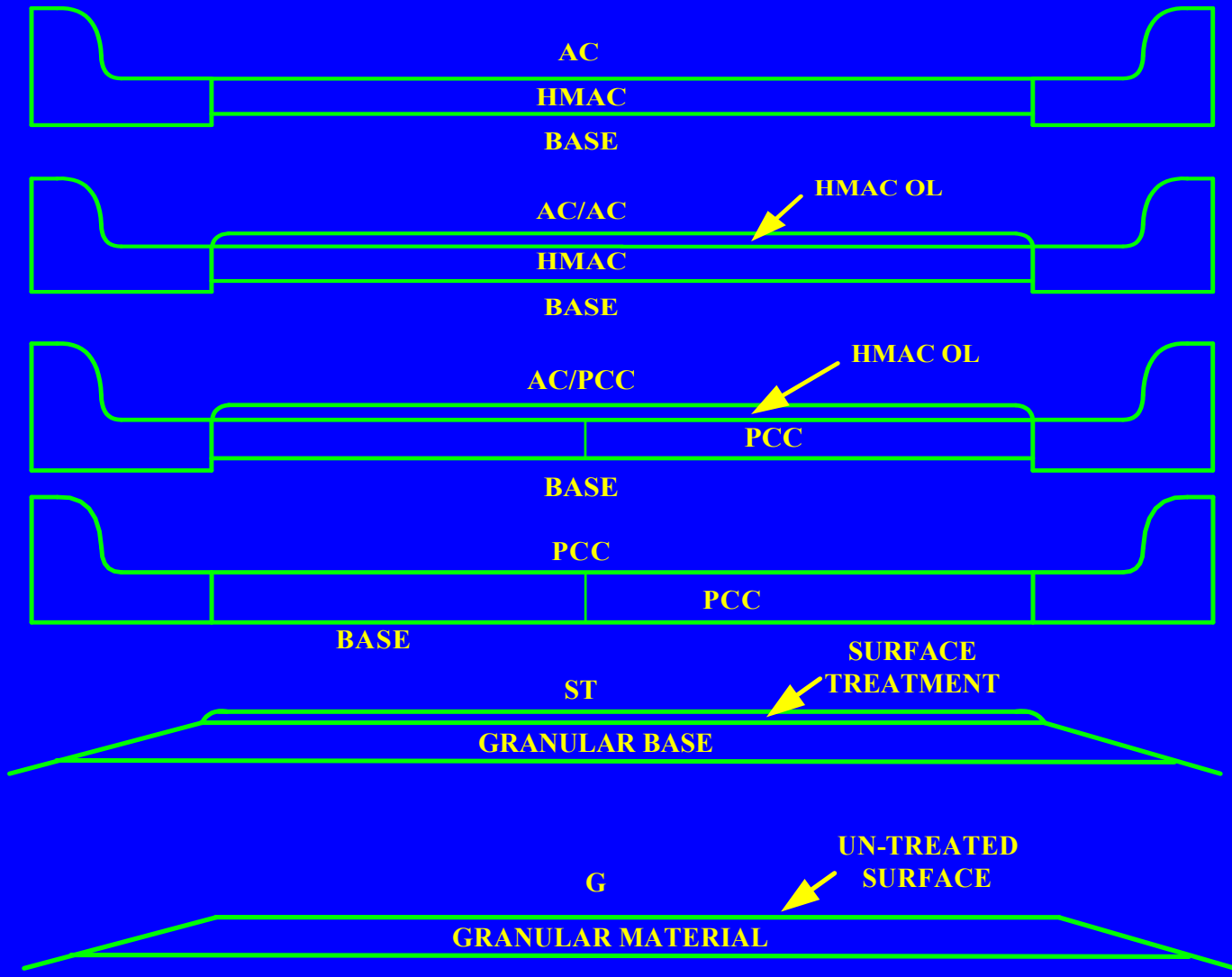
# General Guidelines

- Intersection (urban) or mile marker (rural) methods generally preferred
- Block face method more likely be used in older urban areas
- Lane method only used on multiple lane (generally divided) facilities with different surface types

# Breaking Steps

- Identify street or road to be subdivided
- Break based on Functional Classification

# Break Based on Surface Type



# Breaking Steps (Cont'd)

- Break on Date of Construction/Last Overlay/etc.
- Break Based on??
  - General Code
  - Shoulder Width
  - Area Code
  - Funding Code
  - Other Codes
- Section can only have one

# Breaking Steps (Cont'd)

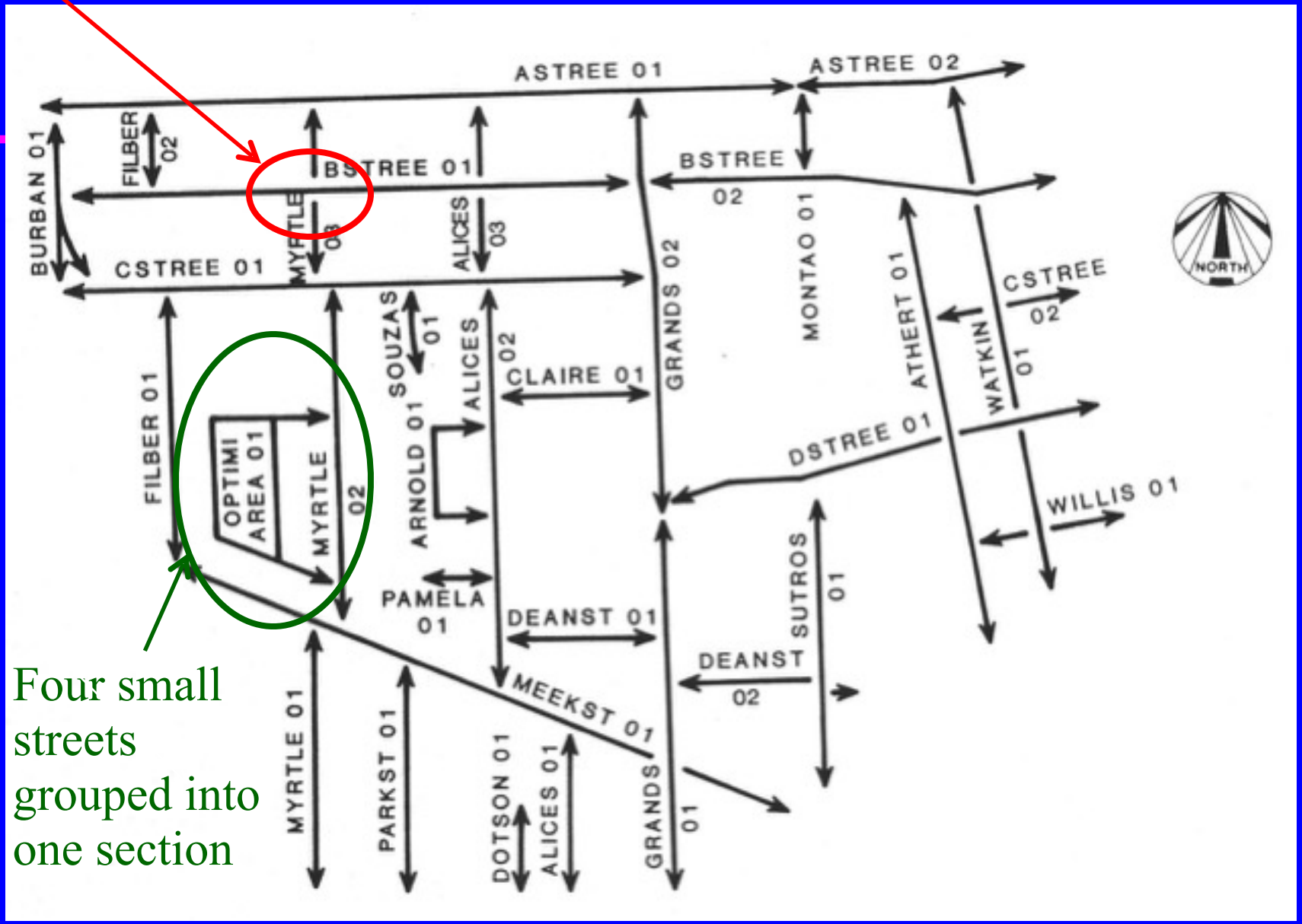
- Break based on Condition (PCI) ??
  - More than 25 PCI Points Difference Among Inspection Units Within same Management Section??

# Special Cases

- Intersections
  - Must belong to a section
  - Can only belong to one section
  - Can be a separate section if unique

- Grouped Roads/Streets
  - Reflect management policies
  - Uniform developments

Intersection belongs to B Street




Four small streets grouped into one section

# Special Cases

- Small Areas of Different Materials
  - PCC bus turn-outs or parking areas in AC streets
  - Ignore small area in section definition
  - Rate as patch, if needed

- Different Surface Types in Same Block
  - Lane Method or Shoulder?

# Section Adjustments

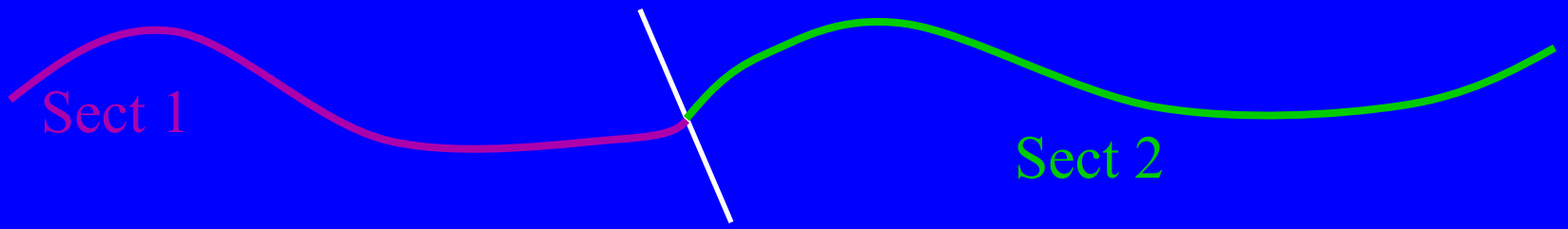
- Like our data, most agencies have sections developed over a number of years by different agency and consultant personnel

- Some sections may need to be adjusted

# Splitting & Combining Existing Sections

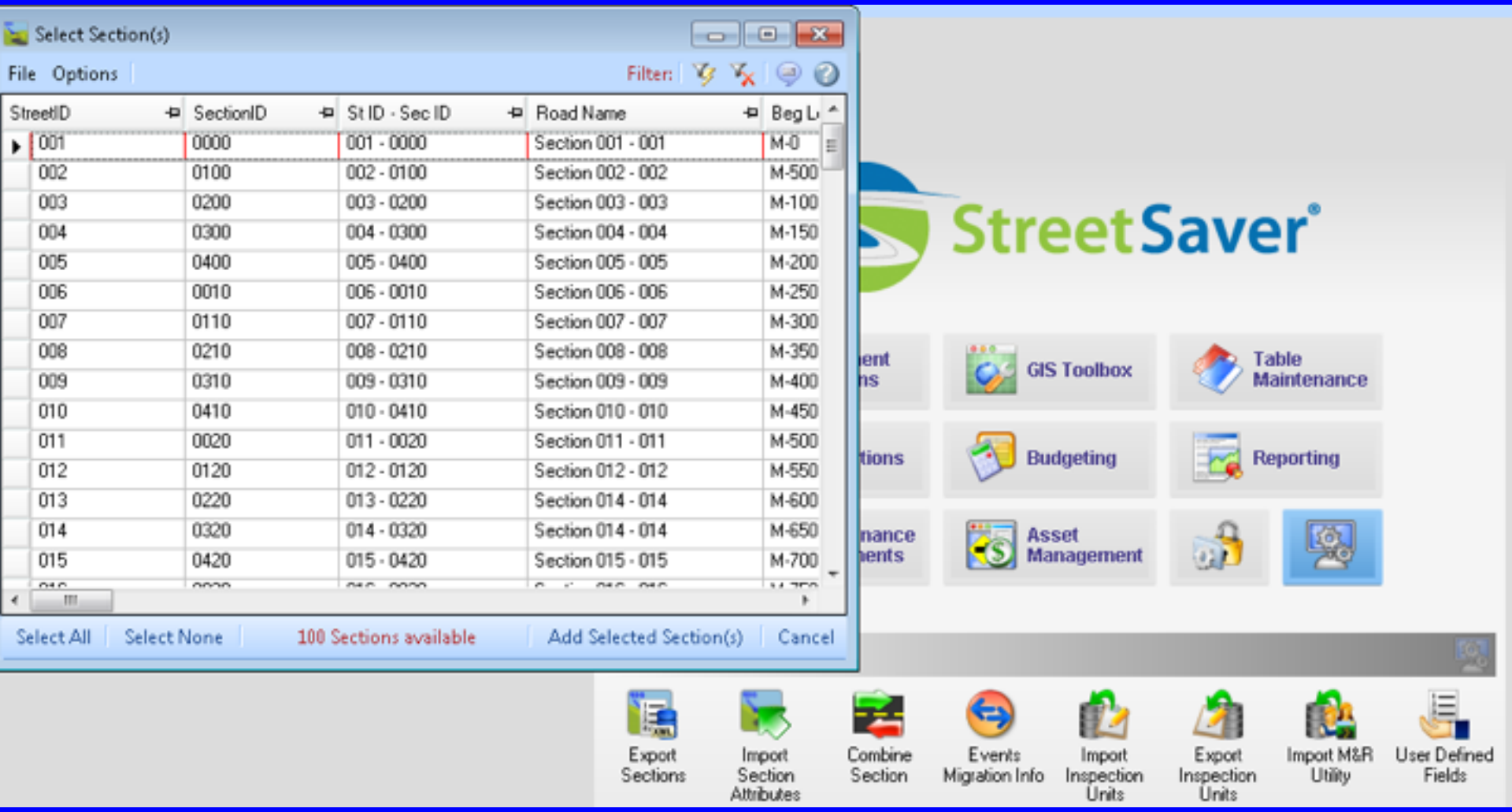
- Existing sections can be:
  - Split
    - » A section can be subdivided into two or more sections
  - Combined
    - » Two or more sections can be combined into a single section

# Combining Existing Sections
## Same FC, Area Code, etc.

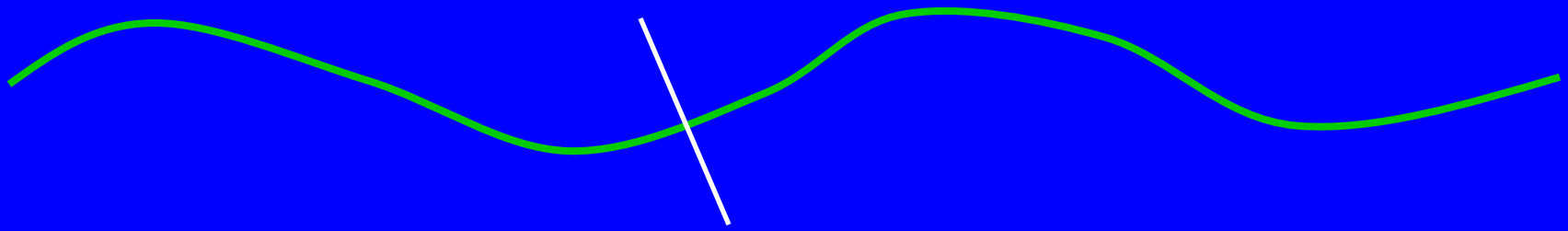



- Sect 1 – Const 1952 as AC, overlaid in 1989
- Sect 2 – Const 1964 as AC, overlaid in 1994
- Both reworked full-depth to 8 inch depth in 2014, surfaced with 3 inch HMAC
- Combine both into one section

# Select Sections to Combine

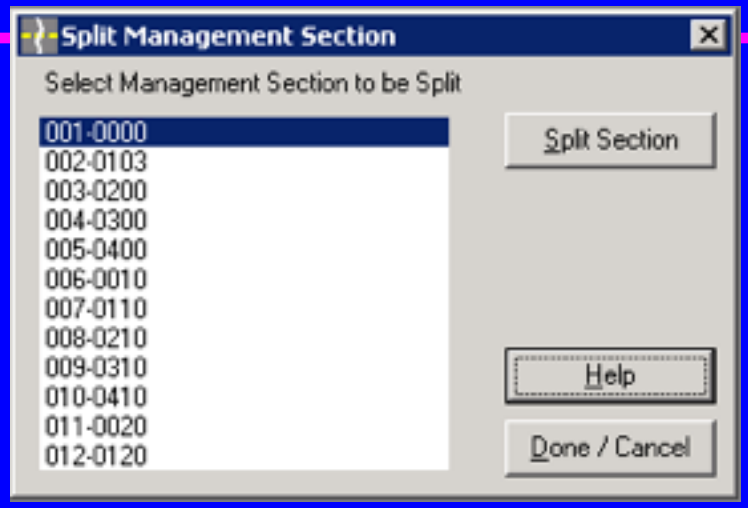


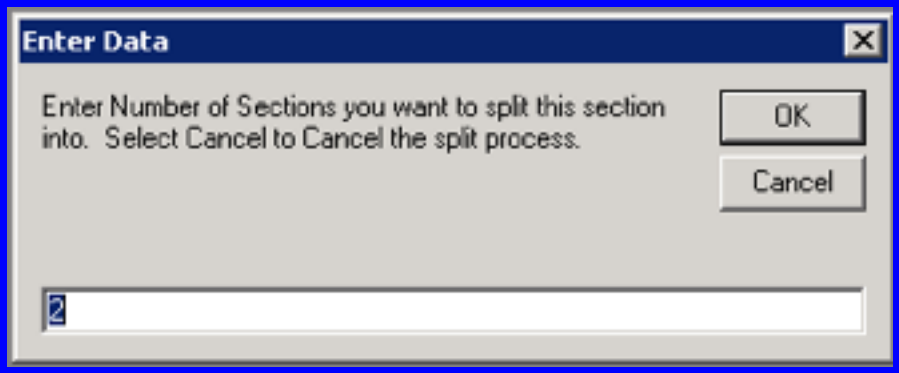
# Splitting or Sub-dividing Existing Sections

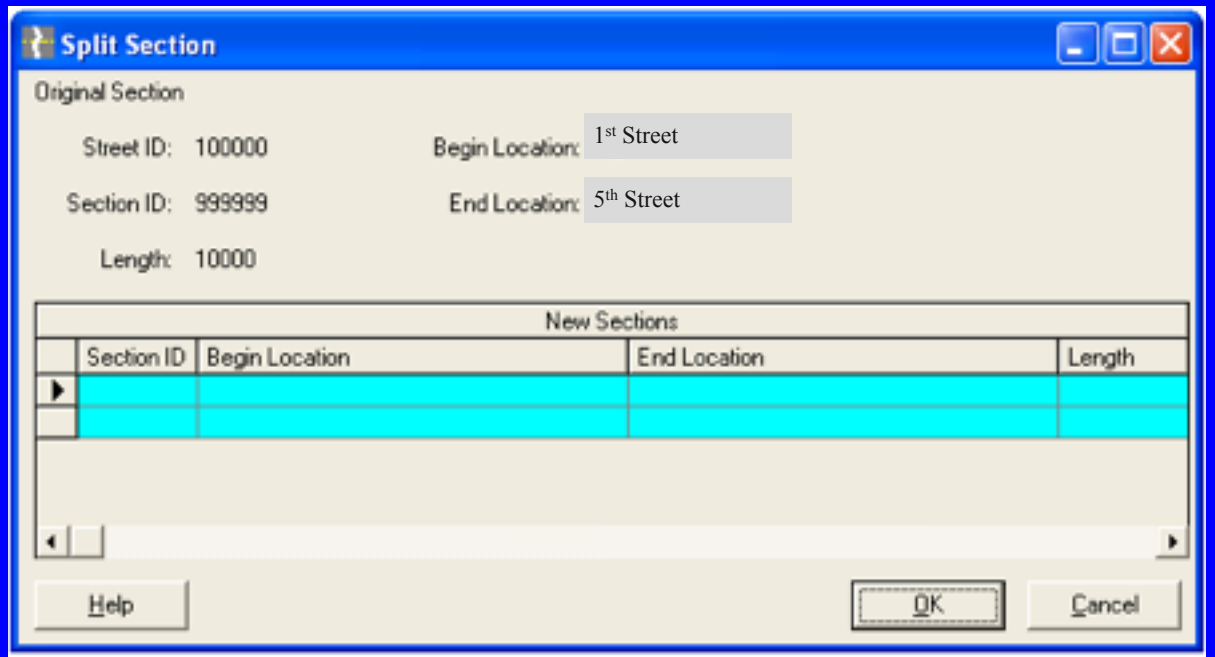


- Const 1964, overlaid in 1982.
- First part milled & overlaid in 2012
- Second part reconstructed in 2014
- Break into two sections

# Select Sections to split



# Impacts of Splitting & Combining Existing Sections

- Impacts
  - Combined
    - » Prior inspection & M&R info assumed invalid
  - Split
    - » Prior inspection info assumed invalid
- Need to reinspect to have valid PCI data
- Need to update date of construction, M&R data, etc.
- Splitting & Combining should be reserved for major changes
  - Avoid frequent splits & combines

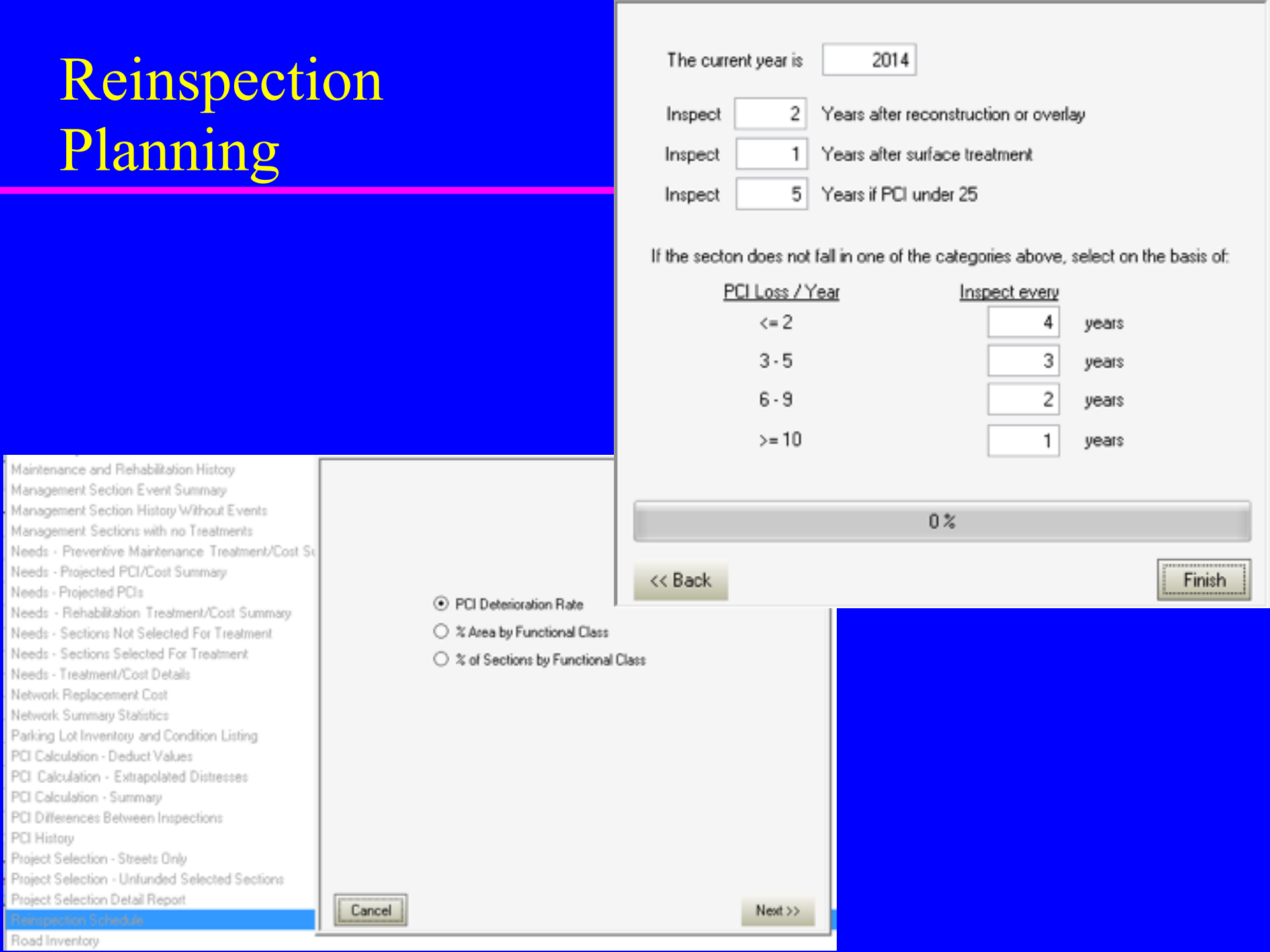
# When to "Re-break" Existing Network

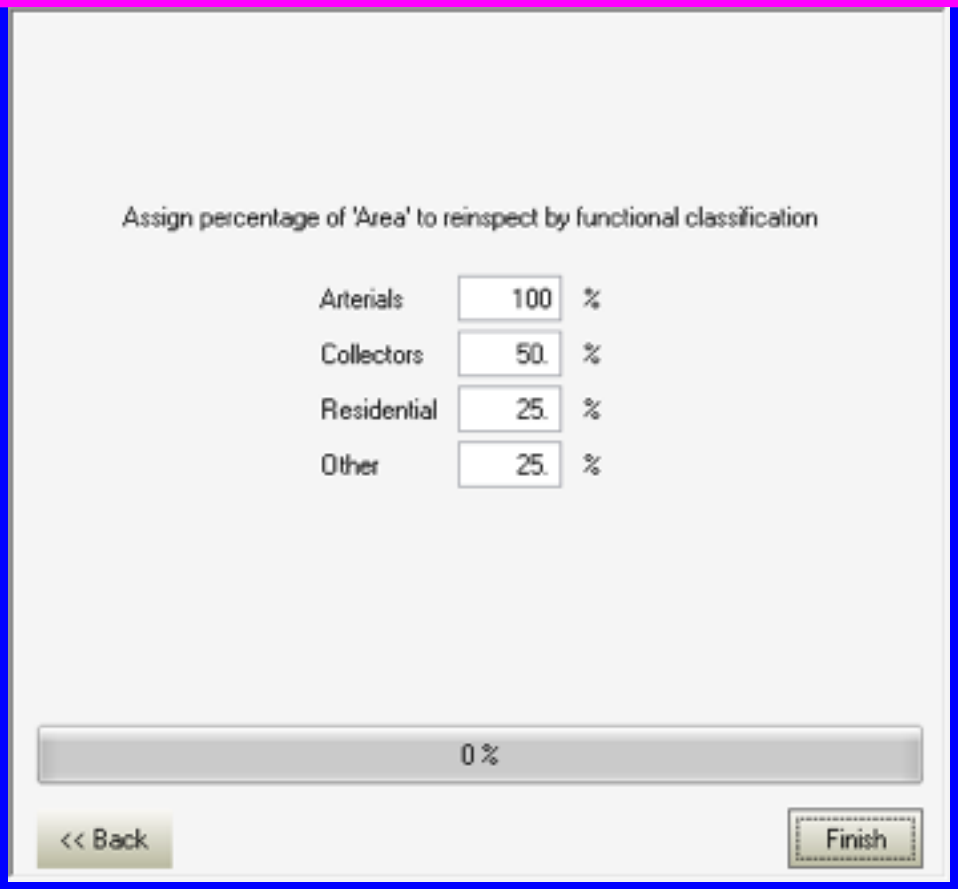
- When many existing segments are
  - Being combined to create work sections
  - Being sub-divided to create work sections
- When sections were incorrectly defined in original PMP network definition
- Just before a major re-inspection effort
  - Need inspection after split or combine to define condition of revised sections

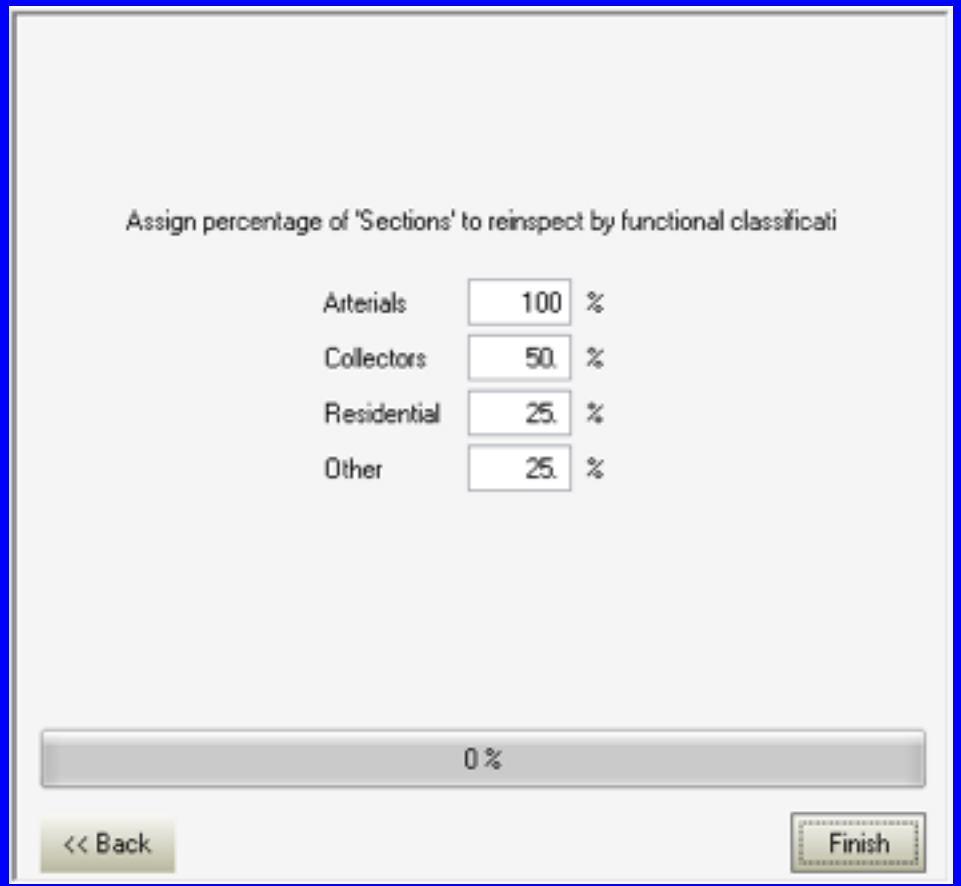
# Reinspection

- Condition deterioration will vary among similar sections due to differences in:
  - Layer thickness & stiffness
  - Traffic loads
  - Subgrade support
  - Localized maintenance
- Need periodic reinspection to ensure condition of sections is correct

# Reinspection Planning




Assign percentage of 'Area' to reinspect by functional classification
Arterials 100 %
Collectors 50. %
Residential 25. %
Other 25. %
0 %
<< Back
Finish


Assign percentage of 'Sections' to reinspect by functional classificati
Arterials 100 %
Collectors 50. %
Residential 25. %
Other 25. %
0 %
<< Back
Finish

# Other Approaches for Reinspection Scheduling

- Select Sections Based on Location
- Consider not Inspecting those with Recent (less than 1 year old) Surface Seals

# Distributed Inspection

- Year 1
  - Inspect all arterial & collector sections in north half
  - Inspect all residential/local & others in north-east quadrant
- Year 2
  - Inspect all arterial & collector sections in south half
  - Inspect all residential/local & others in south-east quadrant

- Year 3
  - Inspect all arterial & collector sections in north half
  - Inspect all residential/local & others in north-west quadrant
- Year 2
  - Inspect all arterial & collector sections in south half
  - Inspect all residential/local & others in south-west quadrant

# Concentrated Inspection

- Year 1
  - Inspect all arterial & collector sections
  - Inspect all residential/local & others in north half
- Year 3
  - Inspect all arterial & collector sections
  - Inspect all residential/local & others in south half

# Reinspection is Critical

- Condition projected based on past condition & family curves
- Changes due to non-normal deterioration will change deterioration rates
- Projected values will be off

# Distress ID Systems in StreetSaver®

- MTC Distress ID
- PAVER/ASTM Distress ID
- CRAB recording method

# Quality Control for Supervisors

- Check data coming in daily - look for problems
  - 1 sq ft block cracking
  - Only medium severity L&T, Alligator, & Patching
- Have teams mark inspection units
  - Reinspect same inspection units
- Supervisor reinspect small percent (2-5%)

# Quality Control for Supervisors

- With more than one team
  - Change inspection team members regularly
    - » Don’t let divergence develop
  - Have teams reinspect sections inspected by other teams (5%)

# Contracting for Distress Data Collection

- Define distress ID methodology to be used and precision and accuracy needed
- Require Data Quality Control Plan
- Establish Data Quality Assurance Plan

- MTC has plans that agencies can end can use in developing their contract plans at: http://www.mtcpms.org/support/consultants.html

# MTC Data Quality Management Plan

- Includes Pre-qualification & Rater Certification for distress identification using the MTC distress definitions

- **Pre-qualification** ensures that contracting agencies are capable of collecting distress data that is reasonably close to what would be collected by an "expert" rater

- **Rater Certification Program** Under the P-TAP, even if a firm has pre-qualified, all of the firm's raters must The exam is scheduled on **November 19 & 20, 2014**

# Data Quality Control Plan

- Each firm required to provide Quality Control Plan that includes
  - Qualifications of each rater
  - Description of their data verification processes including what checks will be made and actions to be taken when issues arise

# MTC Data Quality Acceptance Plan

- **1) Administer Rater Certification Program**
  Pre-qualification of the contractor does not ensure that all raters are capable of rating with the desired level of accuracy.
  - All raters employed by the qualified contractors must complete rating of about 20 survey. The net exam is scheduled on **November 19 & 20, 2014**
  - Includes a field pavement distress survey test and an online written test.
- **2) Conduct Audits of Contractors' Quality Control Plans**
  - MTC reviews quality control plans and approves prior to commencement of work
  - CSUC conducts audits of the QCP results to ensure that the data collection contractors are meeting the requirements established in their plans.
- **3) Verify Data Collected by Contractors**
  - CSUC conducts full audits of the data collected from selected projects when issues are encountered
  - CSUC spot checks data collected by contractors from selected projects

# MTC Maintains List of Consultants that have experience with StreetSaver®

**AMS Consulting LLC***
5627 Stoneridge Dr, Suite 320
Pleasanton, CA 94588
925.225.9922

Aslab Pty Ltd
P.O. Box 1061
Bibra Lake DC,
Western Australia 6965
+61-08-9434-2540

California Engineering Company, Inc
1110 Civic Center Blvd, Ste 404
Yuba City, CA 95993
530-751-0452 x111

Farallon Geographics Inc.
609 Mission St, 2nd Floor
San Francisco, CA 94105
415.227.1140

GeoData Analytics, LLC
2510 Tassajara Avenue
El Cerrito, CA 94530
510.234.9485

Kleinfelder Inc.
8 Pasteur, Suite 190
Irvine, CA 92618
949.727.4466

ASCG Inc.
6501 Americas Parkway, Suite 400
Albuquerque, NM 87110
505.247.0294

Bureau Veritas
6150 Stoneridge Mall Road, Suite 370
Pleasanton, CA 94588
925.468.7413

Coastland Civil Engineering, Inc.
1400 Neotomas Avenue
Santa Rosa, CA 95405
707.571.8005

Freiburger Engineering
P.O. Box O
Twin Falls, ID 83303
208.732.5972

**Harris & Associates***
120 Mason Circle
Concord, CA 94520-1272
925.827.4900

MACTEC Engr. and Consultants, Inc.
961 Matley Lane, Suite 110
Reno, NV 89502
775.329.6123

**Adhara Systems***
1735 N. First St. Suite 200
San Jose, CA 95112
408.441.0340

CSG Consultants, Inc.
1660 South Amphlett Blvd., Suite 330
San Mateo, CA 94402
650.522.2525

**Capitol Asset & Pavement Services***
P.O.Box 7840
Salem, OR 97303
503.689.1330

Fugro Consultants
8613 Cross Park Drive
Austin, TX 78754
512-977-1800

IMS
116 N. Roosevelt, Suite 131
Chandler, AZ 85226
480.839.4347

**Nichols Consulting Engineers***
501 Canal Blvd, Suite I
Point Richmond, CA 94804
510.215.3620

Northwest Management System
3302 N. 7th Street
Tacoma, WA 98406
253.219.8904

Norris Repke Inc
400 N. Tustin Ave., Suite 230
Santa Ana, CA 92705
714.973.2263

**Pavement Engineering Inc. ***
3820 Cypress Drive, Suite 3
Petaluma, CA 94954
707.769.5330

PENCO Engineering
One Technology Park, Bldg J-725
Irvine, CA 92618
949.753.8111

RKA Civil Engineers Inc.
398 S. Lemon Creek Dr, Suite E
Walnut, CA 91789-2649
909.594.9702

Fugro-Roadware Group Inc
147 E. River Road
Paris, Ontario N3L 3T6
Canada
+1 519.442.2264

STANTEC Consulting Engineers
8211 S 48th Street
Phoenix, AZ 85041
602.438.2200

i-TEN Associates, Inc.
5 Eton Court
Berkeley, CA 94705
510.654.3263

Applied Pavement Technology
115 W. Main St, Suite 400
Urbana, IL 61801
217.398.3977

**Associated Engineering Consultants ***
20179 Charlanned Drive
Redding, CA 96002
530.226.1616

AECOM
2101 Webster Street, Ste. 1900
Oakland, CA 94612
510.622.6627

BKF Engineers
1646 N. California Boulevard, Suite 400
Walnut Creek, CA 94596
925.940.2207

The Barnhardt Group, LLC
1001 Bayhill Drive, Suite 200
San Bruno, CA 94066
650.922.0469

DNMZ Consulting Engineers
P.O. Box 411818
Craighall, 2024
South Africa
+27-11-789-9512

Pavement Services, Inc
3835 NE Tillamook Street
Portland, OR 97086
503-235-0377

JG3 Consulting, LLC*
P. O. Box 2377
Heath, OH 43056
800-638-8040

Quality Engineering Solutions*
405 Water Street
Conneaut Lake, PA 16316
814-382-0373

# Consultant List

- http://www.mtcpms.org/support/consultants.html
- These consultants are licensed to use StreetSaver®. Consultants with an * passed pre-qualification tests in 2012.
- Highlighted consultants are currently under contract with MTC as qualified PTAP consultants

# QA/QC Is Worth the Effort

- You wouldn't let contractors construct pavements without conducting QA/QC
- You shouldn't purchase distress or other condition data without a QA/QC program
- Avoid "garbage in > garbage out"

# On-line Distress Training

Self-Paced Online Courses:

- Pavement Condition Assessment:
  - MTC's 7- Distress protocol
  - ASTM D6433 (full Paver distresses)
- More info:

  www.mtcpms.org/products

# Rater Certification Program

Part of MTC Data Quality Management Plan:

- Must attend a distress survey class or
- Online pavement condition assessment class
- Pass a 8-hour field test
- Pass an online knowledge test
- Certification good for 2 years

www.mtcpms.org/support/QualityMgtProgram.html

Next Field Test:  November 19 & 20, 2014

# Individual Agency Questions