City of Davis
Pavement Management Program
Davis Street and Bike Path System

• 163 centerline miles of streets (33 million square feet)
  – 34.6 miles of arterials 21%
  – 22.8 miles of collectors 14%
  – 103.9 miles of local streets 64%

• 52 miles of bike paths (3 million square feet)
Pavement Management Consultant

• City conducted competitive selection process
  – 6 proposals received
  – 3 firms interviewed

• Entered into agreement with Nichols Consulting Engineers in August 2012
  – Surveyed all City streets and bike paths in fall 2012
  – Prepared three budget scenarios
  – Report will be posted on PW webpage
Pavement Condition Index (PCI)

• Definition: Method of quantifying pavement condition

• Score from 0 to 100
  – Score of 100 given to a newly paved street or path
Pavement Condition Index (PCI)

- Average PCI of Davis streets = 62
- Average PCI of bike paths = 59

[Condition Category | Pavement Condition | PCI Category]

I | Very Good | 100
II/III | Good | 70
IV | Poor | 50
V | Failed | 25

Courtesy of NCE
### Arterials

<table>
<thead>
<tr>
<th>Functional Class / Category</th>
<th>Centerline Miles</th>
<th>Average PCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterials</td>
<td>34.6</td>
<td>63</td>
</tr>
</tbody>
</table>

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[Map of Arterial Roads]
Collectors

<table>
<thead>
<tr>
<th>Functional Class / Category</th>
<th>Centerline Miles</th>
<th>Average PCI</th>
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<tbody>
<tr>
<td>Collectors</td>
<td>22.8</td>
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## Local Streets

<table>
<thead>
<tr>
<th>Functional Class / Category</th>
<th>Centerline Miles</th>
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<tbody>
<tr>
<td>Local</td>
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## Bike Paths

<table>
<thead>
<tr>
<th>Functional Class / Category</th>
<th>Centerline Miles</th>
<th>Average PCI</th>
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<tbody>
<tr>
<td>Bike Paths</td>
<td>51.7</td>
<td>59</td>
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</table>

[Map of Bike Paths]
Summary

<table>
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City of Davis
“State of the Pavements”

Margot Yapp, P.E.
Nichols Consulting Engineers, Chtd.
February 5th, 2013
What is a Pavement Management Program?

- A tool to assist Cities make cost-effective decisions
- Answers 4 main questions:
  - What does Davis have in the street & bike network?
  - What condition is it in?
  - What repairs are needed and when?
  - How much money is required to maintain or improve streets/bike paths cost-effectively?
- StreetSaver® software
How is Condition Measured?

- **Good - Excellent**: Davis is at 62 (for Streets) and 59 (for Bicycle paths).
- **At Risk**: 70
- **Poor**: 50
- **Failed**: 25
- **0**: Failed

Images depict the condition of the street and bicycle path.
Current PCI condition- 2012

- **Street Network**
  - **Good to Excellent**: 36.9%
  - **Fair**: 34.0%
  - **Poor**: 26.8%
  - **Failed**: 2.3%

- **Bicycle Paths**
  - **Good to Excellent**: 26.9%
  - **Fair**: 32.3%
  - **Poor**: 36.1%
  - **Failed**: 4.7%

**Current PCI Condition - 2012**

- **Good (71-100)**
- **At Risk (55-70)**
- **Poor (25-54)**
- **Failed (0-24)**
“Right” Treatment Depends on . . .

- Existing pavement
  - Distresses, structure, drainage, etc.
- Environment
  - Climate, traffic, etc.
- Life cycle costs
  - Initial, maintenance, rehab & downtime costs, service life, etc.
- Locally available treatments
  - Materials, contractors, quality, performance, costs, etc.
Types of Treatments

- Preventive Maintenance:
  - Good - Excellent
  - At Risk
  - Poor
  - Failed

- Rehabilitation

- Reconstruction
Preventive Maintenance Treatments

- Crack Seal
- Fog Seal
- Slurry Seal
- Scrub Seal
- Chip Seal
- Cape Seal
- Micro-Surfacing
- Ultrathin Bonded Wearing Surface
Rehabilitation

- AC overlays
  - Rubberized AC
  - Warm mix asphalt
- Mill and fill
- Cold in place recycling
- Recycle AC at plant
Reconstruction

- Remove and replace
- Full depth reclamation (FDR)
- Perpetual pavements
“Pay Now or Pay More Later”

Pavement Condition (PCI)

Time

- Surface Seal: $4.50/sy
- Thin AC Overlay: $20/sy
- Thick AC Overlay: $27/sy
- Reconstruction: $81/sy
Funding Scenarios
- Streets -
Existing City Budget ($1 M/year)
Improve PCI to 70 ($8M/year)
Maintain Backlog ($7M/year)

Unfunded Backlog ($ Millions)

Pavement Condition Index (PCI)

Year: 2012 to 2032

Unfunded Backlog ($7M/year)
Funding Scenarios
- Bicycle Paths -
Existing City Budget ($200k/yr)

### Unfunded Backlog ($ Millions)

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### Pavement Condition Index (PCI)

- **Unfunded Backlog:**
  - 2012: $1
  - 2013: $1
  - 2014: $1
  - 2015: $2
  - 2016: $3
  - 2017: $5
  - 2018: $8
  - 2019: $9
  - 2020: $10
  - 2021: $11
  - 2022: $11
  - 2023: $12
  - 2024: $13
  - 2025: $15
  - 2026: $16
  - 2027: $17
  - 2028: $20
  - 2029: $22
  - 2030: $25
  - 2031: $28
  - 2032: $30

- **PCI:**
  - 2012: 59
  - 2013: 61
  - 2014: 60
  - 2015: 59
  - 2016: 59
  - 2017: 58
  - 2018: 57
  - 2019: 56
  - 2020: 56
  - 2021: 54
  - 2022: 54
  - 2023: 53
  - 2024: 52
  - 2025: 51
  - 2026: 51
  - 2027: 50
  - 2028: 49
  - 2029: 49
  - 2030: 48
  - 2031: 47
  - 2032: 46
Improve PCI to 70 ($0.7M/year)
Maintain backlog ($655k/Year)

<table>
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<th>Year</th>
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<tr>
<td>2032</td>
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</table>

Unfunded Backlog ($ Millions)

- 2012: $59
- 2013: $61
- 2014: $60
- 2015: $60
- 2016: $63
- 2017: $66
- 2018: $71
- 2019: $73
- 2020: $74
- 2021: $74
- 2022: $73
- 2023: $73
- 2024: $72
- 2025: $72
- 2026: $71
- 2027: $70
- 2028: $71
- 2029: $70
- 2030: $71
- 2031: $70
- 2032: $69

Pavement Condition Index (PCI)
Why are costs so high?

Pavements are deteriorating rapidly

Asphalt prices increased eight-fold since 1999
Conclusions

• Davis has a substantial investment:
  • $167 M - streets
  • $24 M - bicycle paths

• Network are in “fair” condition
  • Streets PCI = 62, Bike PCI = 59

• Network will continue to deteriorate under existing funding levels

• Significant funding increases are needed to improve conditions
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(510) 215-3620
Looking Forward – Policy Considerations

• What additional information would Council like for future meetings?

• Budget Issues (How much to fund, how to fund)

• How to prioritize streets/paths?
  – All treated equally
  – Arterials/collectors versus local
  – Those near schools, parks
  – Let Streetsaver select

• What scenario to use: NCE recommends Scenario 3 but we could select scenario 1 or 2 or develop a fourth (e.g. let no street drop below a threshold PCI)