City of Ames has completed five Concrete Overlays to date

- Lincoln Way (Beach Avenue to University Boulevard) (2003)
  - 6” Unbonded PCC Overlay
- Ontario Street (North Dakota Avenue to Woodstock Avenue) (2003)
  - Ultra-thin Whitetopping
- Mortensen Parkway (Welch Road to University Boulevard) (2004)
  - Min. 6” Unbonded PCC Overlay
- George W Carver Avenue (Stange Road to Bloomington Road) (2010)
  - 6” Unbonded PCC Overlay
- North Dakota Avenue (Delaware Avenue to Ontario Street) (2010)
  - 7” Unbonded PCC Overlay
Lincoln Way

6” Unbonded PCC Overlay

Overlay Limits
Beach Avenue to University Boulevard
(formerly Elwood Drive)
Lincoln Way
Lincoln Way

1959
Lincoln Way

1959
Lincoln Way

• Designed by WHKS & Co., Ames

• Scott Williams, P.E.; Design Engineer

• Existing pavement section
  Original 8” PCC, 1921
  Widening 10” PCC, 1958
  Rehabilitation in 1987
    9” PCC median
    3” ACC overlay
    STP funding – IDOT specs
Design pavement section
6” Unbonded PCC Overlay
Use existing ACC as “Bond Breaker”
Beach, Elwood: 8” PCC
Financing:

STP funding - $480,000
Local – G.O. Bonds
IDOT letting, Feb. 2003
Allied Construction; $870,000

6” Unbonded PCC Overlay items
PCC furnish: 1,600 CY - $66
PCC placement: 7,300 CY - $8

8” PCC, full-depth: 9,500 SY - $27
Coordination:

- ISU
- Iowa State Center
- Private Utilities
- City of Ames
  - Electric
  - Traffic
  - CyRide
  - Police
  - Fire
  - EMS

✓ Weekly Meetings

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**TABULATION OF SPECIAL EVENTS**

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<thead>
<tr>
<th>Event</th>
<th>Location</th>
<th>Date</th>
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<tr>
<td>FFA CONFERENCE</td>
<td>ISU</td>
<td>4/6/03 - 4/8/03</td>
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<tr>
<td>SPRING GRADUATION</td>
<td>ISU</td>
<td>5/10/03</td>
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<td>IOWA SPECIAL OLYMPICS</td>
<td>ISU</td>
<td>5/22/03 - 5/24/03</td>
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<td>ODYSSEY OF THE MIND</td>
<td>ISU</td>
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<td>SUMMER FIRE SCHOOL</td>
<td>ISU</td>
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<td>WITNESS OUR WELCOME</td>
<td>ISU</td>
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<td>PHI KAPPA PSI</td>
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<td>ISU SUMMER GRADUATION</td>
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<tr>
<td>WOMEN OF FAITH</td>
<td>ISU</td>
<td>8/14/03 - 8/16/03</td>
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Cracking due to lack of support from the edge of original pavement
Ontario
Ontario

Ultra-thin Whitetopping

North Dakota Avenue to Woodstock Avenue
• Designed by City of Ames Public Works

• John C. Joiner, P.E.; Design Engineer

• Existing pavement section
  Original asphalt pavement on Rolled Stone Base, 1961
  Widening in 1963
  ACC overlay 1982
3” Bonded Whitetopping

Milled top 3” of existing asphalt pavement

Milled pavement had to be clean & washed first thing in morning, let dry, then place PCC.
Joint Layout
Financing

Local funding, G.O. Bonds
Local letting, Jan. 2001
Allied Construction; $1,618,162
Project included:
3” Ultra-thin Whitetopping and
8” PCC, full-depth reconstruction east to Hyland
Cracking due to lack of support from the edge of original pavement OR “heavier than anticipated loads”?
Cracking due to lack of support from the edge of original pavement OR “heavier than anticipated loads”?
Mortensen
Mortensen

6” nominal

Overlay Limits
Welch Road to University Boulevard
Mortensen

- Designed by HR Green, Inc.
- David R. Dougherty, P.E.; Design Engineer
- Previous pavement section

  Constructed 1978,
  7” PCC on 4 to 5” sand,
  no dowels
2003 ADT = 10,500 vpd
2023 ADT = 15,200 vpd
% Trucks = 2%
Design Speed = 30mph
Constructed 1978, 7” PCC on 4 to 5” sand, no dowels
Partial Rehab 1988
Urban Section w/ C&G
Mortensen

$\frac{1}{4}''$ to $\frac{1}{2}''$

Direction of Travel

Fault Depth

Transverse Joint, Load Transfer Fault

City of Ames
Mortensen

• Restore Serviceability
• Keep Project on Budget
• Complete Construction While ISU on Break (3 months)
• Work Within Existing ROW
• Complete Reconstruction
  • Not in Budget
  • Schedule Concerns
  • Does not utilize value of existing pavement structure
Remove Trees

Adjust Utilities

Rebuild Intakes

Match Grade

Relocate Lights

Side Drainage
Existing Features:
Subdrain & drainable base
Existing curb in good condition – Removed by grinding
Mortensen

Superelevation Correction
Significant Joint Reflection in HMA Bond Breaker
Changed to 6’ Transverse Spacing and ¼ Point Longitudinal Joints
Mortensen

One Area of Cracking
GW Carver
GW Carver

6” Unbonded PCC Overlay

Overlay Limits
Stange Road to Bloomington Road
GW Carver

• Designed by City of Ames Public Works

• Corey Mellies, P.E.; Design Engineer

• Existing pavement section
  Original 7” PCC, 1980
Design pavement section

6” Unbonded PCC Overlay

Full reconstruction for transition to existing
GW Carver

Financing:
ARRA “Porkulous” funding
Local – G.O. Bonds for Engineering
IDOT letting, Aug. 2009
Manatt’s, Inc. $ 753,595
GW Carver

Design considerations:

• Superelevation along curve
• Drainage – existing intakes & culverts set at angles
• Intersection tie-ins
• Transition between urban and rural roadway section
• Restriped intersection at Stange Road/24th Street
GW Carver

601510 85 155 CTGWCRVR A A 5 0.495 53.0 2008/08/14
GW Carver
GW Carver
GW Carver
North Dakota

6” Unbonded PCC Overlay

Overlay Limits from Delaware Avenue to Ontario Street
North Dakota
North Dakota

• Designed by HR Green, Inc.

• David R. Dougherty, P.E.; Design Engineer

• Previous pavement section
  Constructed 1967, 9.5” HMA on-grade
  Urban Section w/ Curb & Gutter
  1980, 2” Mill & Overlay
  1991, 6” Subdrain – NB Lanes
North Dakota

2008 ADT = 5,600 to 8,300 vpd
2030 ADT = 16,000 to 19,000 vpd
% Trucks = 1%
Design Speed = 40mph
Constructed 1967, 9.5” HMA on-grade
1980, 2” Mill & Overlay
1991, 6” Subdrain – NB Lanes
Urban Section w/ C&G
North Dakota
Pavement Conditions

Areas of pavement failure or pavement cores showing thin or deteriorated pavement = Patch or Reconstruction
North Dakota

6” Unbonded PCC Overlay

Overlay Limits
Delaware Avenue to Ontario Street
North Dakota

Objectives and Constraints

- Restore Serviceability: Long-Term
- Keep Project on Budget
- Work Within Existing ROW
- Complete Reconstruction
  - Not in Budget
    - Budget = $1.36M
    - Reconstruction = $2.1M
  - Schedule Concerns - Detours
  - Does not utilize value of existing pavement
- Mill and Overlay
  - Did not meet long-term objectives
- Unbonded PCC Overlay
  - $1.355M
North Dakota
Remove Median
Remove Curb
Rebuild Intakes
Save Trees
Avoid Trapping Drainage
Gain Trail Separation
No Utility Relocates
North Dakota

- Eliminated Median, Shifted Alignment Left
- Removed, Patched Median with HMA
- Removed right curb & gutter – Trail separation, Exist Pvmt as paver pad
- Removed left curb & gutter – Modified subbase, added subdrain
- Pave on existing pavement with only surface cleaning
Notes:
1. 36" *4 tie bars spaced 30" on center
2. 60" *4 tie bars spaced 30" on center
3. No longitudinal joint

**Typical Jointing Detail**
(Overlay over Removed Median)
North Dakota
Jointing

- 12.5-foot transverse joint spacing
- Reconstructed sideroad connections
North Dakota
Final Thoughts

• PCC overlays can be successful in an urban setting
• PCC overlays can be an economical, long-term rehabilitation strategy
  • Benefit from local expertise: CP Tech Center, Iowa Concrete Paving Association, Dr. James Cable
Questions?