To: John Fortmann
From: John D. Baranzelli
Subject: Pavement Design
Date: October 31, 2014

FAI Route 55 (I-55)
Will County
At Weber Road

The project, submitted to BDE by memo dated October 20, 2014, will reconstruct the above intersection. Weber Road will be constructed from south of Normantown Road to Rodeo Drive/Remington Boulevard to provide three lanes in each direction. This roadway is designated as “High Stress”, since the MU ADT exceeds 200 vehicles. The LCCA favored a rigid design for Weber Road by more than 10%. The interchange ramps will match the mainline HMA pavement. All the local roadways will be HMA as requested by the appropriate jurisdictional entities.

The approved pavement design is as follows:

Weber Road (Pavement Reconstruction)
10.25 inches of Jointed PCC Pavement with Tied PCC Curb & Gutter
12 inches of Aggregate Subgrade Improvement

I-55 Ramps at Weber Road (Pavement Reconstruction)
12.25 inches of Full Depth HMA Pavement with HMA Shoulders
2 inches of Polymerized HMA Surface Course, Mix “F”, N90
2.25 inches of Polymerized HMA Binder Course, IL-19.0, N90
8 inches of HMA Base Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

Normantown Road (Pavement Reconstruction)
10.75 inches of Full Depth HMA Pavement with PCC Curb & Gutter
2 inches of Polymerized HMA Surface Course, Mix “F”, N90
2.25 inches of Polymerized HMA Binder Course, IL-19.0, N90
6.5 inches of HMA Base Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement
Lakeview Drive (East Leg)(Pavement Reconstruction)
7.25 inches of Full Depth HMA Pavement with PCC Curb & Gutter
  2 inches of HMA Surface Course, Mix "D", N70
  5.25 inches of HMA Binder Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

Remington Boulevard/Wincham Parkway (Pavement Reconstruction)
9.75 inches of Full Depth HMA Pavement with PCC Curb & Gutter
  2 inches of HMA Surface Course, Mix "D", N70
  7.75 inches of HMA Binder Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

Carlow Drive (Pavement Reconstruction)
7.25 inches of Full Depth HMA Pavement with PCC Curb & Gutter
  2 inches of HMA Surface Course, Mix "D", N70
  5.25 inches of HMA Binder Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

Rodeo Drive (Pavement Reconstruction)
8.25 inches of Full Depth HMA Pavement with PCC Curb & Gutter
  2 inches of HMA Surface Course, Mix "D", N70
  6.25 inches of HMA Binder Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

Remington Boulevard (Pavement Reconstruction)
12.5 inches of Full Depth HMA Pavement with PCC Curb & Gutter
  2 inches of Polymerized HMA Surface Course, Mix "F", N80
  2.25 inches of Polymerized HMA Binder Course, IL-19.0, N90
  8.25 inches of HMA Base Course, IL-19.0, N70
12 inches of Aggregate Subgrade Improvement

If you have any questions, please contact Paul Niedernhofer at (217) 524-1651.
To: John D. Baranzelli
From: Jose A. Dominguez
Subject: Pavement Analysis*

Date: October 20, 2014
*Route: Interstate Route 55
Limits: at Weber Road
Section: (99-1HB-1)R-1
Current target: 06CY15
County: Will
Contract No.: 60x10
Job No.: D-91-009-14

We have completed the pavement analysis for the above captioned location. Review by the Central Office is required since the total pavement area for reconstruction exceeds 4,750 square yards. **NOTE: Review is not required for Normantown Rd., Lakeview Dr., Remington Blvd., Windham Pkwy., Carlow Dr., and Rodeo Dr. as these roadways are under local jurisdiction but are included for your information.** The following is the scope of the project:

**Reconstruction of the interchange I-55 at Weber Road. Reconstruction of Weber Road from south of Normantown Road to Rodeo Drive/Remington Boulevard to provide 3 lanes in each direction.**

The project area is considered “High Stress” since the design lane MU ADT exceeds 200 vehicles. District 1 recommends Mix “F” N90 at “High Stress” intersections to be built at a minimum 150 feet back from the location of the stop bar. A 20-year pavement analysis was performed for the above segments. The Village of Romeoville and the Village of Bolingbrook have requested HMA pavement on all roadways under their jurisdiction which include Normantown Rd., Lakeview Dr., Remington Blvd., Windham Pkwy., Carlow Dr., and Rodeo Dr.

A life-cycle cost analysis was performed for all roadways to be reconstructed which favors PCC pavement by 14.0% for Weber Road. Per BDE 54-1.06, the I-55 at Weber Road interchange ramps will be HMA pavement to match the pavement type of mainline I-55. Our recommendation is as follows:

**Weber Road**

Reconstruction
PCC Curb and Gutter (Tied.)
10 ½” PCC Pavement (Jointed)
12” Aggregate Subgrade Improvement
I-55 Ramps at Weber Road
Reconstruction
HMA Shoulders\textsuperscript{13}
12 ¼" Full Depth HMA\textsuperscript{12}
2" Polymerized HMA Surface Course, Mix “F”, N90\textsuperscript{2}
2 ¼" Polymerized HMA Binder Course, IL-19.0, N90\textsuperscript{3}
8" HMA Base Course, IL-19.0, N70\textsuperscript{4}
12" Aggregate Subgrade Improvement\textsuperscript{11}

Normantown Road\textsuperscript{14}
Reconstruction
PCC Curb and Gutter
10 ¾" Full Depth HMA\textsuperscript{12}
2" Polymerized HMA Surface Course, Mix “F”, N90\textsuperscript{2}
2 ¼" Polymerized HMA Binder Course, IL-19.0, N90\textsuperscript{3}
6 ½" HMA Base Course, IL-19.0, N70\textsuperscript{6}
12" Aggregate Subgrade Improvement\textsuperscript{11}

Lakeview Drive (East leg)\textsuperscript{14}
Reconstruction
PCC Curb and Gutter
7 ¼" Full Depth HMA\textsuperscript{12}
2" HMA Surface Course, Mix “D”, N70\textsuperscript{6}
5 ¼" HMA Base Course, IL-19.0, N70\textsuperscript{7}
12" Aggregate Subgrade Improvement\textsuperscript{11}

Remington Blvd./Windham Pkwy\textsuperscript{14}
Reconstruction
PCC Curb and Gutter
9 ¾" Full Depth HMA\textsuperscript{12}
2" HMA Surface Course, Mix “D”, N70\textsuperscript{6}
7 ¾" HMA Base Course, IL-19.0, N70\textsuperscript{8}
12" Aggregate Subgrade Improvement\textsuperscript{11}

Carlow Drive\textsuperscript{14}
Reconstruction
PCC Curb and Gutter
7 ¾" Full Depth HMA\textsuperscript{12}
2" HMA Surface Course, Mix “D”, N70\textsuperscript{6}
5 ¾" HMA Base Course, IL-19.0, N70\textsuperscript{7}
12" Aggregate Subgrade Improvement\textsuperscript{11}
John D. Baranzelli
October 20, 2014
Page Three

**Rodeo Drive**
Reconstruction
PCC Curb and Gutter
  8 ¾" Full Depth HMA
    2" HMA Surface Course, Mix "D", N70
    6 ¼" HMA Base Course, IL-19.0, N70
  12" Aggregate Subgrade Improvement

**Remington Blvd**
Reconstruction
PCC Curb and Gutter
  12 ½" Full Depth HMA
    2" Polymerized HMA Surface Course, Mix "F", N90
    2 ¾" Polymerized HMA Binder Course, IL-19.0, N90
    8 ¾" HMA Base Course, IL-19.0, N70
  12" Aggregate Subgrade Improvement

---

1Designer Note 1: Use pay item 42000506, PORTLAND CEMENT CONCRETE PAVEMENT 10 ¾" (JOINTED), paid for in square yards.

2Designer Note 2: Use pay item 40603595, POLYMERIZED HOT-MIX ASPHALT SURFACE COURSE, MIX "F", N90 paid for in tons.

3Designer Note 3: Use pay item 40603240, POLYMERIZED HOT-MIX ASPHALT BINDER COURSE, IL-19.0, N90 paid for in tons.

4Designer Note 4: Use pay item 35501316, HOT-MIX ASPHALT BASE COURSE, 8", paid for in square yards.

5Designer Note 5: Use pay item 35501310, HOT-MIX ASPHALT BASE COURSE, 6 ½", paid for in square yards.

6Designer Note 6: Use pay item 40603340, HOT-MIX ASPHALT SURFACE COURSE, MIX "D", N70 paid for in tons.

7Designer Note 7: Use pay item 35501305, HOT-MIX ASPHALT BASE COURSE, 5 ½", paid for in square yards.

8Designer Note 8: Use pay item 35501315, HOT-MIX ASPHALT BASE COURSE, 7 ¾", paid for in square yards.

9Designer Note 9: Use pay item 35501309, HOT-MIX ASPHALT BASE COURSE, 6 ¾", paid for in square yards.
10 Design Note 10: Use pay item 35501317, HOT-MIX ASPHALT BASE COURSE, 8 1/4", paid for in square yards.

11 Design Note 11: Use pay item 30300112, AGGREGATE SUBGRADE IMPROVEMENT, 12", paid in square yards.

12 Design Note 12: Refer to the District One, Bureau of Materials' "Hot-Mix Asphalt – Mix Selection" tables to determine the corresponding HMA mix table requirements for the plans.

13 Design Note 13: The designer shall utilize IDOT Highway Standards in conjunction with guidelines in BDE Manual 34-2.02 for shoulder thicknesses.

14 Design Note 14: Normantown Road, Lakeview Drive, Remington Boulevard, Windham Parkway, Carlow Drive, Rodeo Drive, and a segment of Weber Road are subject to local jurisdictional approval and concurrence.

If you have any questions or need additional information, please contact Ojas Patel, Pavement Design Engineer, at (847)705-4550.

By: Jose A. Dominguez, P.E.
Project Support Engineer
## IDOT MECHANISTIC PAVEMENT DESIGN

### PROJECT AND TRAFFIC INPUTS

<table>
<thead>
<tr>
<th>Route</th>
<th>Weber Road</th>
<th>Comments: I-55 @ Weber Road (Ramps and North Portion)</th>
<th>Coordination with BDE Req'd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section</td>
<td>99-1HB-1</td>
<td>Design Date: 08/12/2014</td>
<td>ONP</td>
</tr>
<tr>
<td>County</td>
<td>Will</td>
<td>Modify Date:</td>
<td>BY</td>
</tr>
<tr>
<td>Location</td>
<td>Normaltown to Lakeview Dr</td>
<td>&lt;BY</td>
<td>ADT Year</td>
</tr>
<tr>
<td>Facility Type</td>
<td>Other Marked State Route</td>
<td>Current</td>
<td>39,200</td>
</tr>
<tr>
<td># of Lanes</td>
<td>6 or more</td>
<td>Future</td>
<td>33,000</td>
</tr>
</tbody>
</table>

### Structural Design Traffic

<table>
<thead>
<tr>
<th>Minimum</th>
<th>Actual</th>
<th>Actual %</th>
<th>% of ADT in Design Lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV</td>
<td>0</td>
<td>47,472</td>
<td>92.9%</td>
</tr>
<tr>
<td>SU</td>
<td>250</td>
<td>920</td>
<td>1.8%</td>
</tr>
<tr>
<td>MU</td>
<td>750</td>
<td>2,708</td>
<td>5.3%</td>
</tr>
<tr>
<td>PV + SU + MU</td>
<td>725</td>
<td>5,070</td>
<td>100%</td>
</tr>
<tr>
<td>Struct. Design ADT = 51,100 (2025)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FLEXIBLE PAVEMENT

| Cpuv | 0.15 |
| Cu     | 132.5 |
| Cmu     | 482.53 |
| TF flexible (Actual) | 10.58 (Actual ADT) |
| TF flexible (Min) | 2.92 (Min ADT Fig. 54-2.C) |
| Use Full-Depth HMA Thickness | 12.50 inches |

### RIGID PAVEMENT

| Cpv | 0.15 |
| Cu     | 143.81 |
| Cmu     | 696.42 |
| TF rigid (Actual) | 14.95 (Actual ADT) |
| TF rigid (Min) | 4.13 (Min ADT Fig. 54-2.C) |
| Use CRCP Thickness | 9.50 inches |

### NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS

**Full-Depth HMA Pavement**
- Use TF flexible = 10.58
- PG Grade Lower Binder Lifts = PG 60-42 (Fig. 53-4.R)
- HMA Mixture Temp. = 75.5 deg F (Fig. 56-5.C)
- Design HMA Mixture Modulus (E\text{f}) = 680 ksi (Fig. 54-5.D)
- Design HMA Strain @ (0.0015) = 61 (Fig. 54-5.E)
- Full Depth HMA Design Thickness = 12.50 in. (Fig. 54-5.F)
- Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.I)
- Use Full-Depth HMA Thickness = 12.50 inches

**JPCP Pavement**
- Use TF rigid = 14.95
- Edge Support = Tired Shoulder or C.&G.
- Rigid Part Thick. = 10.25 in. (Fig. 54-4.E)
- Use CRCP Thickness = 9.50 in. (Fig. 54-4.M)
- TF MUST BE > 60 FOR CRCP

### RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS

**HMA Overlay of Rubblized PCC**
- Use TF flexible = 10.58
- HMA Overlay Design Thickness = 9.75 in. (Fig. 54-5.U)
- Limiting Strain Criterion Thickness = 14.75 in. (Fig. 54-5.V)
- Use HMA Overlay Thickness = 9.99 inches

**Unbonded Concrete Overlay**
- Review 54.4.03 for limitations and special considerations.

### DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN

#### Class I Roads
- 4 lanes or more
- Part of future 4 lanes or more
- One-way Streets with ADT > 3500

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Min. Str. Design Traffic (Fig 54-2.C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate of Freeway</td>
<td>PV</td>
</tr>
<tr>
<td>Other Marked State Route</td>
<td>0</td>
</tr>
<tr>
<td>Unmarked State Route</td>
<td>No Min</td>
</tr>
</tbody>
</table>

#### Traffic Factor ESAL Coefficients

<table>
<thead>
<tr>
<th>Class</th>
<th>Rigid (Fig. 54-4.C)</th>
<th>Flexible (Fig. 54-5.B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>143.81 695.62 132.55 432.63</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>135.78 567.21 112.06 385.44</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>129.58 562.47 109.14 384.35</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>126.58 562.47 108.14 384.35</td>
<td></td>
</tr>
</tbody>
</table>

#### Class Table for 2 or 3 lanes
- (not future 4 lane & not one-way street)

<table>
<thead>
<tr>
<th>Class</th>
<th>ADT</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>740</td>
<td>IV</td>
</tr>
<tr>
<td>III</td>
<td>750-2000</td>
<td>III</td>
</tr>
<tr>
<td>IV</td>
<td>&gt;2000</td>
<td></td>
</tr>
</tbody>
</table>

#### Design Lane Distribution Factors for Structural Design Traffic (Fig. 54-2.B)

<table>
<thead>
<tr>
<th>Number of Lanes</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lane Ramp</td>
<td>P</td>
<td>S</td>
</tr>
<tr>
<td>2 or 3</td>
<td>P</td>
<td>S</td>
</tr>
<tr>
<td>4</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>8 or more</td>
<td>32%</td>
<td>45%</td>
</tr>
<tr>
<td>12 or more</td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td>18 or more</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>
# LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

## FULL-DEPTH HMA PAVEMENT

**ROUTE**
Webber Road

**SECTION**
99-1HB-1

**COUNTY**

**LOCATION**
Normantown to Lakeview Dr

**FACILITY TYPE**
NON-INTERSTATE

**PROJECT LENGTH**
7535 FT  = 1.43 Miles

**# OF CENTERLINES**
4 CL

**# OF LANES**
6 LANES

**# OF EDGES**
4 EP

**LANE WIDTH - AVERAGE**
12 FT

**SHOULDER WIDTH**

<table>
<thead>
<tr>
<th>HMA Inside</th>
<th>0 FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA Outside</td>
<td>0 FT</td>
</tr>
</tbody>
</table>

**Total Width of Paved Shoulders**
0 FT

**PAVEMENT THICKNESS (FLEXIBLE)**
12.50 IN

**SHOULDER THICKNESS**
8.00 IN

**POLICY OVERLAY THICKNESS**
2.25 IN

**FLEX PAVEMENT TRAFFIC FACTORS**

<table>
<thead>
<tr>
<th>MINIMUM</th>
<th>ACTUAL</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.92</td>
<td>10.64</td>
<td>10.68</td>
</tr>
</tbody>
</table>

**HMA COST PER TON**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>100% QUANTITY</th>
<th>UNIT PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA SURFACE</td>
<td>(12.50&quot;)</td>
<td>60,280 SQ YD</td>
<td>$44.25 / SQ YD</td>
</tr>
<tr>
<td>HMA TOP BINDER COURSE</td>
<td>(12.50&quot;)</td>
<td>6,783 TONS</td>
<td>$78.13 / TON</td>
</tr>
<tr>
<td>HMA LOWER BINDER COURSE</td>
<td>(12.50&quot;)</td>
<td>7,705 TONS</td>
<td>$72.03 / TON</td>
</tr>
<tr>
<td>HMA SHOULDER</td>
<td>(8.00&quot;)</td>
<td>6,815 LIN FT</td>
<td>$204,450</td>
</tr>
<tr>
<td>SUBBASE GRAN MAT TY C (TONS)</td>
<td>390 TONS</td>
<td>$25.00 / TON</td>
<td>$9,750</td>
</tr>
<tr>
<td>IMPROVED SUBGRADE: Aggregate</td>
<td>65,443 SQ YD</td>
<td>$7.00 / SQ YD</td>
<td>$458,101</td>
</tr>
<tr>
<td>Reserved For User Supplied Item</td>
<td>0 UNITS</td>
<td>$0.00 / UNITS</td>
<td>$0</td>
</tr>
<tr>
<td>Reserved For User Supplied Item</td>
<td>0 UNITS</td>
<td>$0.00 / UNITS</td>
<td>$0</td>
</tr>
<tr>
<td>PAVEMENT REMOVAL</td>
<td>60,280 SQ YD</td>
<td>$15.00 / SQ YD</td>
<td>$904,200</td>
</tr>
<tr>
<td>SHOULDER REMOVAL</td>
<td>0 SQ YD</td>
<td>$0.00 / SQ YD</td>
<td>$0</td>
</tr>
</tbody>
</table>

**Note:** * Denotes User Supplied Quantity

**FLEXIBLE CONSTRUCTION INITIAL COST**
$4,243,801

**FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE**
$121,288

## MAINTENANCE COSTS:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
<th>UNIT COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROUTINE MAINTENANCE ACTIVITY</td>
<td></td>
<td></td>
<td>$0.00 LANE-MILE / YEAR</td>
</tr>
<tr>
<td>HMA OVERLAY PVMT SURF</td>
<td>(2.0&quot;)</td>
<td>Surface Mix</td>
<td>$8.79 / SQ YD</td>
</tr>
<tr>
<td>HMA OVERLAY PVMT</td>
<td>(2.25&quot;)</td>
<td>Surface Mix</td>
<td>$9.68 / SQ YD</td>
</tr>
<tr>
<td>HMA SURFACE MIX (1.5&quot;)</td>
<td>(1.5&quot;)</td>
<td>Surface Mix</td>
<td>$4.09 / SQ YD</td>
</tr>
<tr>
<td>HMA BINDER MIX (0.75&quot;)</td>
<td>(0.75&quot;)</td>
<td>Elong Binder Mix</td>
<td>$3.09 / SQ YD</td>
</tr>
<tr>
<td>HMA OVERLAY SHLD (Year 30)</td>
<td>(2.25&quot;)</td>
<td>Shoulder Mix</td>
<td>$9.07 / SQ YD</td>
</tr>
<tr>
<td>HMA OVERLAY SHLD (2.2&quot;)</td>
<td>(2.2&quot;)</td>
<td>Shoulder Mix</td>
<td>$8.06 / SQ YD</td>
</tr>
<tr>
<td>MILLING (2.0&quot;)</td>
<td>2.0&quot;</td>
<td>Surface Mix</td>
<td>$3.00 / SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH PVMT PATCH</td>
<td>(Mill &amp; Fill Surf)</td>
<td>Shoulder Mix</td>
<td>$7.75 / SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH SHLD PATCH</td>
<td>(Mill &amp; Fill Surf)</td>
<td>Shoulder Mix</td>
<td>$7.06 / SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH PVMT PATCH</td>
<td>(Mill &amp; Fill +2.0&quot;)</td>
<td>Elong Binder Mix</td>
<td>$7.19 / SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH SHLD PATCH</td>
<td>(Mill &amp; Fill +2.0&quot;)</td>
<td>Shoulder Mix</td>
<td>$7.06 / SQ YD</td>
</tr>
<tr>
<td>LONGITUDINAL SHOULDER JOINT ROUT &amp; SEAL</td>
<td>2.0&quot;</td>
<td>$2.00 / LIN FT</td>
<td></td>
</tr>
<tr>
<td>CENTERLINE JOINT ROUT &amp; SEAL</td>
<td>2.0&quot;</td>
<td>$2.00 / LIN FT</td>
<td></td>
</tr>
<tr>
<td>RANDOM / THERMAL CRACK ROUT &amp; SEAL</td>
<td>100% Rehab = 110.00' / Station / Lane</td>
<td>$2.00 / LIN FT</td>
<td></td>
</tr>
</tbody>
</table>

**FLEXIBLE TOTAL LIFE-CYCLE COST**
$5,690,647

**FLEXIBLE TOTAL ANNUAL COST PER MILE**
$112,039
## FULL-DEPTH HMA PAVEMENT
### HMA OVERLAY OF RUBBLIZED PCC PAVEMENT

**Figure 54-7.C**

### STANDARD DESIGN

#### MAINTENANCE AND REHABILITATION ACTIVITY SCHEDULE

<table>
<thead>
<tr>
<th>YEAR</th>
<th>MAINTENANCE COSTS</th>
<th>ITEM</th>
<th>%</th>
<th>QUANTITY</th>
<th>UNIT</th>
<th>UNIT COST</th>
<th>COST</th>
<th>PRESENT WORTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEAR 5</td>
<td></td>
<td>LONG SHLD JT R&amp;S</td>
<td>100.00%</td>
<td>30,140</td>
<td>LIN FT</td>
<td>$2.00</td>
<td>$60,280</td>
<td>$60,280</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CNTR LINE JOINT R&amp;S</td>
<td>100.00%</td>
<td>30,140</td>
<td>LIN FT</td>
<td>$2.00</td>
<td>$60,280</td>
<td>$60,280</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RNDM / THRM CRACK R&amp;S</td>
<td>50.00%</td>
<td>24,866</td>
<td>LIN FT</td>
<td>$2.00</td>
<td>$49,732</td>
<td>$49,732</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PD PVMT PATCH  M&amp;F SURF</td>
<td>0.10%</td>
<td>60</td>
<td>SQ YD</td>
<td>$76.75</td>
<td>$4,725</td>
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<td></td>
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<td></td>
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<td>$150,971</td>
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</tbody>
</table>

PWF_n = 0.8626 x PW = 0.8626 x $175,017 = $150,971

| YEAR 10 |                   | LONG SHLD JT R&S       | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | CNTR LINE JOINT R&S    | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | RNDM / THRM CRACK R&S  | 50.00% | 24,866 | LIN FT | $2.00 | $49,732  |  $49,732      |
|         |                   | PD PVMT PATCH  M&F SURF | 0.50%  | 301 | SQ YD   | $78.76 | $23,704  |              |
|         |                   |                       |      |          |       |           |      | $144,351     |

PWF_n = 0.7441 x PW = 0.7441 x $193,996 = $144,351

| YEAR 15 |                   | MILL PVMT & SHLD 2.00" | 100.00% | 60,280 | SQ YD   | $3.00 | $180,840 |              |
|         |                   | PD PVMT PATCH  M&F ADD'L 2.00" | 1.00% | 603 | SQ YD | $78.18 | $47,142  |              |
|         |                   | HMA OVERLAY PVMT 2.00" | 100.00% | 60,280 | SQ YD   | $8.79 | $529,926 |              |
|         |                   | HMA OVERLAY SHLD 2.00" | 100.00% | 0 | SQ YD | $8.08 | $0      |              |
|         |                   |                       |      |          |       |           |      | $488,472    |

PWF_n = 0.6419 x PW = 0.6419 x $757,908 = $488,472

| YEAR 20 |                   | LONG SHLD JT R&S       | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | CNTR LINE JOINT R&S    | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | RNDM / THRM CRACK R&S  | 50.00% | 24,866 | LIN FT | $2.00 | $49,732  |  $49,732      |
|         |                   | PD PVMT PATCH  M&F SURF | 0.10%  | 60 | SQ YD   | $78.76 | $4,725    |              |
|         |                   |                       |      |          |       |           |      | $96,903     |

PWF_n = 0.5537 x PW = 0.5537 x $175,017 = $96,903

| YEAR 25 |                   | LONG SHLD JT R&S       | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | CNTR LINE JOINT R&S    | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | RNDM / THRM CRACK R&S  | 50.00% | 24,866 | LIN FT | $2.00 | $49,732  |  $49,732      |
|         |                   | PD PVMT PATCH  M&F SURF | 0.50%  | 301 | SQ YD   | $78.75 | $23,704  |              |
|         |                   |                       |      |          |       |           |      | $392,654    |

PWF_n = 0.4776 x PW = 0.4776 x $193,996 = $392,654

| YEAR 30 |                   | MILL PVMT & SHLD 2.00" | 100.00% | 60,280 | SQ YD   | $3.00 | $180,840 |              |
|         |                   | PD PVMT PATCH  M&F ADD'L 2.00" | 2.00% | 1,209 | SQ YD | $78.18 | $94,264  |              |
|         |                   | PD SHLD PATCH  M&F ADD'L 2.00" | 1.00% | 0 | SQ YD | $78.06 | $0      |              |
|         |                   | HMA OVERLAY PVMT 2.25" | 100.00% | 60,280 | SQ YD   | $9.68 | $583,486 |              |
|         |                   | HMA OVERLAY SHLD 2.25" | 100.00% | 0 | SQ YD | $9.07 | $0      |              |
|         |                   |                       |      |          |       |           |      | $353,736    |

PWF_n = 0.4120 x PW = 0.4120 x $858,610 = $353,736

| YEAR 35 |                   | LONG SHLD JT R&S       | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | CNTR LINE JOINT R&S    | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | RNDM / THRM CRACK R&S  | 50.00% | 24,866 | LIN FT | $2.00 | $49,732  |  $49,732      |
|         |                   | PD PVMT PATCH  M&F SURF | 0.10%  | 60 | SQ YD   | $78.75 | $4,725    |              |
|         |                   |                       |      |          |       |           |      | $32,198     |

PWF_n = 0.3554 x PW = 0.3554 x $175,017 = $32,198

| YEAR 40 |                   | LONG SHLD JT R&S       | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | CNTR LINE JOINT R&S    | 100.00% | 30,140 | LIN FT | $2.00 | $60,280  |  $60,280      |
|         |                   | RNDM / THRM CRACK R&S  | 50.00% | 24,866 | LIN FT | $2.00 | $49,732  |  $49,732      |
|         |                   | PD PVMT PATCH  M&F SURF | 0.50%  | 301 | SQ YD   | $78.75 | $23,704  |              |
|         |                   |                       |      |          |       |           |      | $59,471     |

PWF_n = 0.3066 x PW = 0.3066 x $193,996 = $59,471

| ROUTINE MAINTENANCE ACTIVITY | 6.56 | Lane Miles | 0.00 | $0 | $0 |              |

| YEAR LIFE CYCLE | CRF_n = 0.0407852 | MAINTENANCE LIFE-CYCLE COST | $1,446,756 |

| MAINTENANCE ANNUAL COST PER MILE | $41,347 |
**PCC PAVEMENT**

**ROUTE**
Weber Road

**SECTION**
99-1HB-1

**COUNTY**
Will County

**LOCATION**
Normantown to Lakeview Dr

**FACILITY TYPE**
NON-INTERSTATE

**PROJECT LENGTH**
7535 FT  =>  1.43 Miles

**# OF CENTERLINES**
4 CL

**# OF LANES**
6 LANES

**# OF EDGES**
4 EP

**LANE WIDTH - AVERAGE**
12 FT

**SHOULDER WIDTH**
PCC Inside 0 FT
PCC Outside 0 FT
Total Width of Paved Shoulders 0 FT

**PAVEMENT THICKNESS (RIGID)**
JPCP 10.25 IN  TIED SHLD

**SHOULDER THICKNESS**
10.25 IN

**POLICY OVERLAY THICKNESS**
2.50 IN

**RIGID PAVEMENT **

<table>
<thead>
<tr>
<th>TRAFFIC FACTORS</th>
<th>MINIMUM</th>
<th>ACTUAL</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worksheet Construction Type</td>
<td>Reconstruction</td>
<td>The Pavement Type</td>
<td>JPCP</td>
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**INITIAL COSTS**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>100% QUANTITY UNIT</th>
<th>UNIT PRICE</th>
<th>COST</th>
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<tbody>
<tr>
<td>JPC PAVEMENT</td>
<td>(10.25&quot;)</td>
<td>60,260 SQ YD</td>
<td>$42.53 / SQ YD</td>
<td>$2,563,708</td>
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<tr>
<td>PAVEMENT REINFORCEMENT</td>
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<td>0 SQ YD</td>
<td>$22.00 / SQ YD</td>
<td>$0</td>
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<tr>
<td>STABILIZED SUBBASE</td>
<td>(4.00&quot;)</td>
<td>0 SQ YD</td>
<td>$19.00 / SQ YD</td>
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<tr>
<td>PCC SHOULDERS</td>
<td>(10.25&quot; to 10.25&quot;)</td>
<td>0 SQ YD</td>
<td>$40.00 / SQ YD</td>
<td>$0</td>
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<tr>
<td>CURB &amp; GUTTER</td>
<td></td>
<td>6,815 LIN FT</td>
<td>$30.00 / LIN FT</td>
<td>$204,450</td>
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<tr>
<td>SUBBASE GRAN MATL TY C</td>
<td></td>
<td>61,954 SQ YD</td>
<td>$7.00 / SQ YD</td>
<td>$433,678</td>
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<tr>
<td>IMPROVED SUBGRADE</td>
<td></td>
<td>61,954 SQ YD</td>
<td>$7.00 / SQ YD</td>
<td>$433,678</td>
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<tr>
<td>Reserved For User Supplied Item</td>
<td></td>
<td>0 UNITS</td>
<td>$0.00 / UNITS</td>
<td>$0</td>
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<tr>
<td>Reserved For User Supplied Item</td>
<td></td>
<td>0 UNITS</td>
<td>$0.00 / UNITS</td>
<td>$0</td>
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<tr>
<td>PAVEMENT REMOVAL</td>
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<td>60,260 SQ YD</td>
<td>$16.00 / SQ YD</td>
<td>$964,200</td>
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<td>SHOULDER REMOVAL</td>
<td></td>
<td>0 SQ YD</td>
<td>$0.00 / SQ YD</td>
<td>$0</td>
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</table>

* Note: * Denotes User Supplied Quantity

**RIGID CONSTRUCTION INITIAL COST** $4,106,036

**RIGID CONSTRUCTION ANNUAL COST PER MILE** $117,348

**MAINTENANCE COSTS:**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
<th>UNIT</th>
<th>UNIT COST</th>
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</thead>
<tbody>
<tr>
<td>ROUTINE MAINTENANCE ACTIVITY</td>
<td></td>
<td></td>
<td></td>
<td>$0.00 / LANE-MILE / YEAR</td>
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<tr>
<td>HMA POLICY OVERLAY</td>
<td>(2.50&quot;)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>HMA POLICY OVERLAP PVMT</td>
<td>(2.50&quot;)</td>
<td>1.000 SQ YD</td>
<td></td>
<td>$10.71 / SQ YD</td>
</tr>
<tr>
<td>HMA SURFACE MIX</td>
<td>(1.50&quot;)</td>
<td>1.000 SQ YD</td>
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<td>$6.90 / SQ YD</td>
</tr>
<tr>
<td>HMA BINDER MIX</td>
<td>(1.00&quot;)</td>
<td>1.000 LIN FT</td>
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<td>$4.13 / LIN FT</td>
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<tr>
<td>HMA POLICY OVERLAY SHLD</td>
<td>(2.50&quot;)</td>
<td>Shoulder Mix</td>
<td>2.50</td>
<td>$10.08 / SQ YD</td>
</tr>
<tr>
<td>CLASS A PAVEMENT PATCHING</td>
<td></td>
<td></td>
<td></td>
<td>$195.00 / SQ YD</td>
</tr>
<tr>
<td>CLASS B PAVEMENT PATCHING</td>
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<td></td>
<td></td>
<td>$160.00 / SQ YD</td>
</tr>
<tr>
<td>CLASS C SHOULDER PATCHING</td>
<td></td>
<td></td>
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<td>$145.00 / SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH PVMT PATCH (Mill &amp; Fill HMA Surf)</td>
<td></td>
<td></td>
<td></td>
<td>$76.09 / SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH PVMT PATCH (Mill &amp; Fill HMA 2.50&quot;)</td>
<td></td>
<td></td>
<td></td>
<td>$80.94 / SQ YD</td>
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<tr>
<td>LONGITUDINAL SHOULDER JOINT ROUT &amp; SEAL</td>
<td></td>
<td></td>
<td></td>
<td>$2.00 / LIN FT</td>
</tr>
<tr>
<td>CENTERLINE JOINT ROUT &amp; SEAL</td>
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<td>$2.00 / LIN FT</td>
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<tr>
<td>REFLECTIVE TRANSVERSE CRACK ROUT &amp; SEAL</td>
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<td></td>
<td></td>
<td>$2.00 / LIN FT</td>
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<tr>
<td>RANDOM CRACK ROUT &amp; SEAL</td>
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<td></td>
<td></td>
<td>$2.00 / LIN FT</td>
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</table>

**RIGID TOTAL LIFE-CYCLE COST** $4,992,212

**RIGID TOTAL ANNUAL COST PER MILE** $142,674
## Jointed Plain Concrete Pavement

### Unbonded Jointed Plain Concrete Overlay

**Figure 54-7.A**

### Maintenance and Rehabilitation Activity Schedule

<table>
<thead>
<tr>
<th>Maintenance Costs:</th>
<th>Item Description</th>
<th>%</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Cost</th>
<th>Present Worth</th>
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<tbody>
<tr>
<td><strong>YEAR 10</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavement Patch Class B</td>
<td>0.10%</td>
<td>60</td>
<td>SQ YD</td>
<td>$150.00</td>
<td>$9,000</td>
<td>$6,697</td>
</tr>
<tr>
<td>Pavinf = 0.7441</td>
<td>Pavin = 0.7441</td>
<td>X</td>
<td>$9,000</td>
<td>$6,697</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>YEAR 15</strong></td>
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<tr>
<td>Pavement Patch Class B</td>
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<td>121</td>
<td>SQ YD</td>
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<td>$18,150</td>
<td>$11,650</td>
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<td>X</td>
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<td>$11,650</td>
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<tr>
<td><strong>YEAR 20</strong></td>
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<tr>
<td>Pavement Patch Class B</td>
<td>2.00%</td>
<td>1,208</td>
<td>SQ YD</td>
<td>$150.00</td>
<td>$180,900</td>
<td>$166,911</td>
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<tr>
<td>Shoulder Patch Class C</td>
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<td>0</td>
<td>SQ YD</td>
<td>$145.00</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Longitudinal Shld Jt &amp; R &amp; S</td>
<td>100.00%</td>
<td>30,140</td>
<td>LIN FT</td>
<td>$2.00</td>
<td>$60,280</td>
<td>$60,280</td>
</tr>
<tr>
<td>Centerline Jt &amp; R &amp; S</td>
<td>100.00%</td>
<td>30,140</td>
<td>LIN FT</td>
<td>$2.00</td>
<td>$60,280</td>
<td>$60,280</td>
</tr>
<tr>
<td>Pavinf = 0.5537</td>
<td>Pavin = 0.5537</td>
<td>X</td>
<td>$301,460</td>
<td>$166,911</td>
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<td><strong>YEAR 25</strong></td>
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<tr>
<td>Pavement Patch Class B</td>
<td>3.00%</td>
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<td>SQ YD</td>
<td>$150.00</td>
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<td>Shoulder Patch Class C</td>
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<td>SQ YD</td>
<td>$145.00</td>
<td>$0</td>
<td>$0</td>
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<td>Pavinf = 0.4776</td>
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<td>X</td>
<td>$271,200</td>
<td>$129,527</td>
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<td><strong>YEAR 30</strong></td>
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<tr>
<td>Pavement Patch Class B</td>
<td>4.00%</td>
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<td>SQ YD</td>
<td>$145.00</td>
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<td>$0</td>
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<tr>
<td>HMA Policy Overlay 2.5&quot; (PVMT.)</td>
<td>100.00%</td>
<td>60,280</td>
<td>SQ YD</td>
<td>$10.71</td>
<td>$645,785</td>
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<td>HMA Policy Overlay 2.5&quot; (SHLD)</td>
<td>100.00%</td>
<td>0</td>
<td>SQ YD</td>
<td>$10.08</td>
<td>$0</td>
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<td><strong>YEAR 35</strong></td>
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<tr>
<td>Longitudinal Shld Jt &amp; R &amp; S</td>
<td>100.00%</td>
<td>30,140</td>
<td>LIN FT</td>
<td>$2.00</td>
<td>$60,280</td>
<td>$60,280</td>
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<tr>
<td>Centerline Jt &amp; R &amp; S</td>
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<td>30,140</td>
<td>LIN FT</td>
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<td>$60,280</td>
<td>$60,280</td>
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<tr>
<td>Random Crack &amp; R &amp; S</td>
<td>50.00%</td>
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<td>LIN FT</td>
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<td>$45,210</td>
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<tr>
<td>Reflective Transverse Crack &amp; R &amp; S</td>
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<td>LIN FT</td>
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<td>$28,918</td>
<td>$28,918</td>
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<tr>
<td>PD Pavement Patch &amp; HMA 2.50&quot;</td>
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<td>60</td>
<td>SQ YD</td>
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<tr>
<td>Pavement Patch Class B</td>
<td>0.50%</td>
<td>301</td>
<td>SQ YD</td>
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<tr>
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<td>$88,1176</td>
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</tbody>
</table>

**Routine Maintenance Activity**

- 8.56 Lane Miles
- Cost: $0
- Annual Cost per Mile: $0

**Maintenance Life Cycle**

- CRFin = 0.0407852
- Maintenance Life Cycle Cost: $888,176
- Maintenance Annual Cost per Mile: $25,326
### LIFE-CYCLE COST ANALYSIS: NEW DESIGN

<table>
<thead>
<tr>
<th></th>
<th>JPCP</th>
<th>HMA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONSTRUCTION</strong></td>
<td><strong>INITIAL COST</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>PRESENT WORTH</strong></td>
<td><strong>$4,106,030</strong></td>
</tr>
<tr>
<td></td>
<td><strong>ANNUAL COST PER MILE</strong></td>
<td><strong>$117,348</strong></td>
</tr>
<tr>
<td><strong>MAINTENANCE</strong></td>
<td><strong>LIFE-CYCLE COST</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>PRESENT WORTH</strong></td>
<td><strong>$886,176</strong></td>
</tr>
<tr>
<td></td>
<td><strong>ANNUAL COST PER MILE</strong></td>
<td><strong>$25,326</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>LIFE-CYCLE COST</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>PRESENT WORTH</strong></td>
<td><strong>$4,992,212</strong></td>
</tr>
<tr>
<td></td>
<td><strong>ANNUAL COST PER MILE</strong></td>
<td><strong>$142,674</strong></td>
</tr>
</tbody>
</table>

### LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

<table>
<thead>
<tr>
<th>LOWEST COST OPTION</th>
<th></th>
<th>JPCP</th>
<th>HMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTHER OPTIONS (LOWEST TO HIGHEST):</td>
<td>TYPE / PERCENTAGE</td>
<td></td>
<td>$162,635</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14.0%</td>
</tr>
</tbody>
</table>

P:\Pavement Design Stuff\D-11-55 at Weber Road\D-55 at Weber Road Pavement Design Files\Mechanistic - Weber Rd (I55 to Lakeview).xlsx|LifeCycleCost
**NEW CONSTRUCTION / RECONSTRUCTION PAVEMENT DESIGN CALCULATIONS**

<table>
<thead>
<tr>
<th>Use TF flexible</th>
<th>9.84</th>
</tr>
</thead>
</table>

**HMA Overlay of Rubblized PCC**

<table>
<thead>
<tr>
<th>Use TF flexible</th>
<th>9.84</th>
</tr>
</thead>
</table>

**RECONSTRUCTION ONLY (SUPPLEMENTAL) PAVEMENT DESIGN CALCULATIONS**

**Unbonded Concrete Overlay**

| Use HMA Overlay Thickness | 999.00 inches |

**JPCP Thickness**

| JPCP Thickness | NA inches |

**CONTACT BMPR FOR ASSISTANCE**

---

**DESIGN TABLES FROM BDE MANUAL CHAPTER 54 - PAVEMENT DESIGN**

<table>
<thead>
<tr>
<th>Class I Roads</th>
<th>Class II Roads</th>
<th>Class III Roads</th>
<th>Class IV Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 lanes or more</td>
<td>Part of a future 4 lanes or more</td>
<td>One-way Streets with ADT &gt; 3500</td>
<td>2 Lanes</td>
</tr>
<tr>
<td>Min. Str. Design Traffic (Fig. 54-2-C)</td>
<td>ADT &gt; 2000</td>
<td>ADT &gt; 500</td>
<td>ADT &gt; 750</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Traffic Factor ESAL Coefficients</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Class</th>
<th>Rigid (Fig. 54-4-C)</th>
<th>Flexible (Fig. 54-5-B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cs</td>
<td>Gmu</td>
<td>Cs</td>
</tr>
<tr>
<td>II</td>
<td>135.78</td>
<td>567.21</td>
</tr>
<tr>
<td>III</td>
<td>129.58</td>
<td>562.47</td>
</tr>
<tr>
<td>IV</td>
<td>129.58</td>
<td>562.47</td>
</tr>
</tbody>
</table>

**Design Lane Distribution Factors For Structural Design Traffic (Fig. 54-2-B)**

<table>
<thead>
<tr>
<th>Number of Lanes</th>
<th>P</th>
<th>S</th>
<th>M</th>
<th>P</th>
<th>S</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Lane Ramp</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2 or 3 lanes</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>4 lanes</td>
<td>32%</td>
<td>45%</td>
<td>45%</td>
<td>32%</td>
<td>45%</td>
<td>45%</td>
</tr>
<tr>
<td>6 or more</td>
<td>20%</td>
<td>40%</td>
<td>40%</td>
<td>8%</td>
<td>37%</td>
<td>37%</td>
</tr>
</tbody>
</table>
LIFE-CYCLE COST ANALYSIS: NEW CONSTRUCTION / RECONSTRUCTION

FULL-DEPTH HMA PAVEMENT

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>I-55 Ramps at Weber</th>
</tr>
</thead>
<tbody>
<tr>
<td>SECTION</td>
<td>96-1HB-1</td>
</tr>
<tr>
<td>COUNTY</td>
<td>Will</td>
</tr>
<tr>
<td>LOCATION</td>
<td>at Weber Read</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FACILITY TYPE</th>
<th>INTERSTATE</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>PROJECT LENGTH</th>
<th>8370 FT = 1.68 Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td># OF CENTERLINES</td>
<td>1 CL</td>
</tr>
<tr>
<td># OF LANES</td>
<td>2 Lanes</td>
</tr>
<tr>
<td># OF EDGES</td>
<td>2 EP</td>
</tr>
<tr>
<td>LANE WIDTH - AVERAGE</td>
<td>12 FT</td>
</tr>
<tr>
<td>SHOULDER WIDTH</td>
<td>HMA Left 6 FT, Right 10 FT</td>
</tr>
<tr>
<td>Total Width of Paved Shoulders</td>
<td>16 FT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS (FLEXIBLE)</th>
<th>12.25 IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHOULDER THICKNESS</td>
<td>8.00 IN</td>
</tr>
<tr>
<td>POLICY OVERLAY THICKNESS</td>
<td>3.75 IN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FLEX PAVEMENT</th>
<th>TRAFFIC FACTORS</th>
<th>MINIMUM</th>
<th>ACTUAL</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA</td>
<td>COST PER TON</td>
<td>UNIT PRICE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA SURFACE</td>
<td>$78.27 /TONT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA TOP BINDER</td>
<td>$72.47 /TONT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA LOWER BINDER</td>
<td>$66.32 /TONT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA BINDER (LEVELING)</td>
<td>$72.47 /TONT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA SHOULDER</td>
<td>$72.00 /TONT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INITIAL COSTS</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>100% QUANTITY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA PAVEMENT (FULL-DEPTH)</td>
<td>(12.25&quot;)</td>
<td>22,525 SQ YD</td>
<td>$42.46 /SQ YD</td>
<td>$1,004,321</td>
<td></td>
</tr>
<tr>
<td>HMA SURFACE</td>
<td>23,653 SQ YD</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA TOP BINDER</td>
<td>2,668 TONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA LOWER BINDER</td>
<td>3,045 TONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA BINDER (LEVELING)</td>
<td>11,204 TONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA SHOULDER</td>
<td>7,064 TONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CURB &amp; GUTTER</td>
<td>0 LIN FT</td>
<td>$30.00 /LIN FT</td>
<td>$0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUBBASE GRAN MATL TY C (TONS)</td>
<td>2,444 TONS</td>
<td>$25.00 /TON</td>
<td>$61,100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMPROVED SUBGRADE</td>
<td>Aggregate 42,420 SQ YD</td>
<td>$7.00 /SQ YD</td>
<td>$298,940</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserved For User Supplied Item</td>
<td>0 UNITS</td>
<td>$0.00 /UNITS</td>
<td>$0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reserved For User Supplied Item</td>
<td>0 UNITS</td>
<td>$0.00 /UNITS</td>
<td>$0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAVEMENT REMOVAL</td>
<td>23,653 SQ YD</td>
<td>$15.00 /SQ YD</td>
<td>$354,756</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHOULDER REMOVAL</td>
<td>15,769 SQ YD</td>
<td>$10.00 /SQ YD</td>
<td>$157,690</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: * Denotes User Supplied Quantity

FLEXIBLE CONSTRUCTION INITIAL COST:
$2,583,487
FLEXIBLE CONSTRUCTION ANNUAL COST PER MILE:
$57,866

MAINTENANCE COSTS:

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
<th>UNIT COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROUTINE MAINTENANCE ACTIVITY</td>
<td></td>
<td></td>
<td>$0.00 LANE-MILE / YEAR</td>
</tr>
<tr>
<td>HMA OVERLAY PVMT SURF</td>
<td>(2.00&quot;)</td>
<td>Surface Mix</td>
<td>$8.83 /SQ YD</td>
</tr>
<tr>
<td>HMA OVERLAY PVMT</td>
<td>(3.75&quot;)</td>
<td>Surface Mix</td>
<td>$16.91 /SQ YD</td>
</tr>
<tr>
<td>HMA SURFACE MIX</td>
<td>(1.5&quot;)</td>
<td>Top Binder Mix</td>
<td>$9.30 /SQ YD</td>
</tr>
<tr>
<td>HMA BINDER MIX</td>
<td>(2.5&quot;)</td>
<td>Shoulder Mix</td>
<td>$7.06 /SQ YD</td>
</tr>
<tr>
<td>HMA OVERLAY SHLD (Year 30)</td>
<td>(1.75&quot;)</td>
<td>Shoulder Mix</td>
<td>$8.06 /SQ YD</td>
</tr>
<tr>
<td>HMA OVERLAY SHLD</td>
<td>(2.00&quot;)</td>
<td>Shoulder Mix</td>
<td>$8.06 /SQ YD</td>
</tr>
<tr>
<td>MILLING (2.00 IN)</td>
<td></td>
<td>Surface Mix</td>
<td>$3.00 /SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH PVMT PATCH</td>
<td>(Mill &amp; Fill Surf)</td>
<td>Surface Mix</td>
<td>$78.77 /SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH SHLD PATCH</td>
<td>(Mill &amp; Fill Surf)</td>
<td>Shoulder Mix</td>
<td>$78.06 /SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH PVMT PATCH</td>
<td>(Mill &amp; Fill +2.00&quot;)</td>
<td>Shoulder Mix</td>
<td>$78.12 /SQ YD</td>
</tr>
<tr>
<td>PARTIAL DEPTH SHLD PATCH</td>
<td>(Mill &amp; Fill +2.00&quot;)</td>
<td>Shoulder Mix</td>
<td>$78.06 /SQ YD</td>
</tr>
<tr>
<td>LONGITUDINAL SHOULDER JOIN ROUT &amp; SEAL</td>
<td></td>
<td></td>
<td>$2.00 /LIN FT</td>
</tr>
<tr>
<td>CENTERLINE ROUT &amp; SEAL</td>
<td></td>
<td></td>
<td>$2.00 /LIN FT</td>
</tr>
<tr>
<td>RANDOM / THERMAL CRACK ROUT &amp; SEAL</td>
<td></td>
<td></td>
<td>$2.00 /LIN FT</td>
</tr>
</tbody>
</table>

FLEXIBLE TOTAL LIFE-CYCLE COST:
$3,194,065
FLEXIBLE TOTAL ANNUAL COST PER MILE:
$77,565
### Maintenance Costs for HMA Overlay of RUBBLED PCC Pavement

#### Year 5
- **Item:** Long Shld. Jt R&S  
  - Quantity: 17,740 Lin Ft  
  - Unit Cost: $3.00  
  - Cost: $53,120
- **Item:** CNTR Line Joint R&S  
  - Quantity: 8,870 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $17,740
- **Item:** RDMD / THRM CRACK R&S  
  - Quantity: 9,757 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $19,514
- **Item:** PD PVMT PATCH & M&F SURF  
  - Quantity: 24 SQ YD  
  - Unit Cost: $76.77  
  - Cost: $1,890

\[
PWFn = 0.8626  \quad PW = 0.8626 \times 74,624 = 64,371
\]

#### Year 10
- **Item:** Long Shld. Jt R&S  
  - Quantity: 17,740 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $35,480
- **Item:** CNTR Line Joint R&S  
  - Quantity: 8,870 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $17,740
- **Item:** RDMD / THRM CRACK R&S  
  - Quantity: 9,757 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $19,514
- **Item:** PD PVMT PATCH & M&F SURF  
  - Quantity: 118 SQ YD  
  - Unit Cost: $76.77  
  - Cost: $9,294

\[
PWFn = 0.7441  \quad PW = 0.7441 \times 82,028 = 61,037
\]

#### Year 15
- **Item:** MILL PVMT & SHLD 2.00"  
  - Quantity: 36,422 SQ YD  
  - Unit Cost: $3.00  
  - Cost: $118,266
- **Item:** PD PVMT PATCH & M&F ADD'L 2.00"  
  - Quantity: 237 SQ YD  
  - Unit Cost: $78.12  
  - Cost: $18,514
- **Item:** HMA OVERLAY PVMT 2.00"  
  - Quantity: 23,653 SQ YD  
  - Unit Cost: $8.83  
  - Cost: $208,791
- **Item:** HMA OVERLAY SHLD 2.00"  
  - Quantity: 15,789 SQ YD  
  - Unit Cost: $8.05  
  - Cost: $127,160

\[
PWFn = 0.6419  \quad PW = 0.6419 \times 472,731 = 303,428
\]

#### Year 20
- **Item:** Long Shld. Jt R&S  
  - Quantity: 17,740 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $35,480
- **Item:** CNTR Line Joint R&S  
  - Quantity: 8,870 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $17,740
- **Item:** RDMD / THRM CRACK R&S  
  - Quantity: 9,757 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $19,514
- **Item:** PD PVMT PATCH & M&F SURF  
  - Quantity: 24 SQ YD  
  - Unit Cost: $76.77  
  - Cost: $1,890

\[
PWFn = 0.5637  \quad PW = 0.5637 \times 74,524 = 41,317
\]

#### Year 25
- **Item:** Long Shld. Jt R&S  
  - Quantity: 17,740 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $35,480
- **Item:** CNTR Line Joint R&S  
  - Quantity: 8,870 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $17,740
- **Item:** RDMD / THRM CRACK R&S  
  - Quantity: 9,757 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $19,514
- **Item:** PD PVMT PATCH & M&F SURF  
  - Quantity: 118 SQ YD  
  - Unit Cost: $78.77  
  - Cost: $9,294

\[
PWFn = 0.4776  \quad PW = 0.4776 \times 82,028 = 39,177
\]

#### Year 30
- **Item:** MILL PVMT ONLY 2.00"  
  - Quantity: 23,653 SQ YD  
  - Unit Cost: $3.00  
  - Cost: $70,959
- **Item:** PD PVMT PATCH & M&F ADD'L 2.00"  
  - Quantity: 473 SQ YD  
  - Unit Cost: $78.12  
  - Cost: $36,949
- **Item:** PD PVMT PATCH & M&F SURF 2.00"  
  - Quantity: 156 SQ YD  
  - Unit Cost: $78.05  
  - Cost: $12,334
- **Item:** HMA OVERLAY PVMT 3.75"  
  - Quantity: 23,653 SQ YD  
  - Unit Cost: $15.91  
  - Cost: $376,244
- **Item:** HMA OVERLAY SHLD 1.75"  
  - Quantity: 15,789 SQ YD  
  - Unit Cost: $7.06  
  - Cost: $111,265

\[
PWFn = 0.4120  \quad PW = 0.4120 \times 607,751 = 250,385
\]

#### Year 40
- **Item:** Long Shld. Jt R&S  
  - Quantity: 17,740 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $35,480
- **Item:** CNTR Line Joint R&S  
  - Quantity: 8,870 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $17,740
- **Item:** RDMD / THRM CRACK R&S  
  - Quantity: 9,757 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $19,514
- **Item:** PD PVMT PATCH & M&F SURF  
  - Quantity: 24 SQ YD  
  - Unit Cost: $78.77  
  - Cost: $1,890

\[
PWFn = 0.3554  \quad PW = 0.3554 \times 74,624 = 26,520
\]

#### Year 45
- **Item:** Long Shld. Jt R&S  
  - Quantity: 17,740 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $35,480
- **Item:** CNTR Line Joint R&S  
  - Quantity: 8,870 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $17,740
- **Item:** RDMD / THRM CRACK R&S  
  - Quantity: 9,757 Lin Ft  
  - Unit Cost: $2.00  
  - Cost: $19,514
- **Item:** PD PVMT PATCH & M&F SURF  
  - Quantity: 118 SQ YD  
  - Unit Cost: $78.77  
  - Cost: $9,294

\[
PWFn = 0.3066  \quad PW = 0.3066 \times 92,028 = 25,146
\]

**Total Maintenance Life-Cycle Cost:** $811,381

**Maintenance Annual Cost Per Mile:** $19,699
## PCC PAVEMENT

### ROUTE
- I-55 Ramps at Weber 99-1HB-1
- Will at Weber Road

### FACILITY TYPE
- INTERSTATE

### PROJECT LENGTH
= 8870 FT => 1.66 Miles

### # OF CENTERLINES
- 1 CL

### # OF LANES
- 2 LANES

### # OF EDGES
- 2 EP

### LANE WIDTH - AVERAGE
- 12 FT

### SHOULDER WIDTH
- PCC Left 6 FT
- PCC Right 10 FT
- Total Width of Paved Shoulders 16 FT

### PAVEMENT THICKNESS (RIGID)
- JPCP 10.25 IN
- SHOULDER THICKNESS 10.25 IN

### POLICY OVERLAY THICKNESS
- 3.75 IN

### RIGID PAVEMENT TRAFFIC FACTORS

<table>
<thead>
<tr>
<th>MINIMUM</th>
<th>ACTUAL</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.13</td>
<td>13.89</td>
</tr>
</tbody>
</table>

Worksheet Construction Type is Reconstruction
The Pavement Type is JPCP

### INITIAL COSTS

<table>
<thead>
<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>100% QUANTITY UNIT</th>
<th>UNIT PRICE</th>
<th>UNIT COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPC PAVEMENT</td>
<td>(10.25&quot;)</td>
<td>23,653 SQ YD</td>
<td>$43.59 SQ YD</td>
<td>$1,031,034</td>
</tr>
<tr>
<td>PAVEMENT REINFORCEMENT</td>
<td></td>
<td>0 SQ YD</td>
<td>$22.00 SQ YD</td>
<td>$0</td>
</tr>
<tr>
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<td>SUBBASE GRAN MATL TY C</td>
<td>(10&quot;)</td>
<td>1,855 TONS</td>
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<td>IMPROVED SUBGRADE</td>
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Note: * Denotes User Supplied Quantity

RIGID CONSTRUCTION INITIAL COST $3,099,100
RIGID CONSTRUCTION ANNUAL COST PER MILE $73,055

### MAINTENANCE COSTS:

<table>
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<tr>
<th>ITEM</th>
<th>THICKNESS</th>
<th>MATERIAL</th>
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<th>UNIT COST</th>
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<tr>
<td>ROUTINE MAINTENANCE ACTIVITY</td>
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<td></td>
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<tr>
<td>HMA POLICY OVERLAY</td>
<td>(3.76&quot;)</td>
<td>1.0</td>
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<td>$16.91 / SQ YD</td>
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<tr>
<td>HMA POLICY OVERLAY PVMT</td>
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<td>HMA SURFACE MIX</td>
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<td>Surface Mix</td>
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<td>HMA BINDER MIX</td>
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<td>Top Binder Mix</td>
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<td>CLASS A PAVEMENT PATCHING</td>
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<td>CLASS B PAVEMENT PATCHING</td>
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<td>(Mill &amp; Fill HMA Surf)</td>
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<td>CENTERLINE JOINT ROUT &amp; SEAL</td>
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<td>REFLECTIVE TRANSVERSE CRACK ROUT &amp; SEAL</td>
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<tr>
<td>RANDOM CRACK ROUT &amp; SEAL</td>
<td>(100% Rehab = 100.00 / Station / Lane)</td>
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RIGID TOTAL LIFE-CYCLE COST $3,544,129
RIGID TOTAL ANNUAL COST PER MILE $86,044
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<th>MAINTENANCE COSTS</th>
<th>ITEM</th>
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<th>UNIT</th>
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# LIFE-CYCLE COST ANALYSIS: NEW DESIGN

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<tr>
<th></th>
<th>JPCP</th>
<th>HMA</th>
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<tbody>
<tr>
<td><strong>CONSTRUCTION</strong></td>
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<tr>
<td><strong>INITIAL COST</strong></td>
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<td><strong>ANNUAL COST PER MILE</strong></td>
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<td><strong>ANNUAL COST PER MILE</strong></td>
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# LIFE-CYCLE COST ANALYSIS: FINAL SUMMARY

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<td>TYPE / PERCENTAGE</td>
<td>JPCP</td>
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P:\Pavement Design Stuff\I-55 at Weber Road\I-55 at Weber Road Pavement Design Files\Mechanistic - I-55 Ramps at Weber.xsm\LifeCycleCost
Location Map

Proposed Improvement

Weber Road and Interstate 55 Interchange
Normantown Road to Rodeo Drive/Remington Boulevard

Municipality: Bolingbrook/Romeoville
County: Will
Route: FAP 856
Project No.: P-91-186-09
LEGEND:
1 EXISTING PAVEMENT
2 EXISTING BASE COURSE
3 EXISTING GRANULAR SUB-BASE
4 EXISTING PAVED SHOULDER
 5 PROPOSED PAVEMENT
 6 PROPOSED BASE COURSE
 7 PROPOSED GRANULAR SUB-BASE
 8 PROPOSED PAVED SHOULDER
 9 PROPOSED ASPHALT SHOULDER

EXISTING TYPICAL SECTION
(IN DIRECTION OF TRAVEL)

PROPOSED TYPICAL TANGENT SECTION
(IN DIRECTION OF TRAVEL)

PROPOSED TYPICAL SUPERELEVATED SECTION
(IN DIRECTION OF TRAVEL)