CITY OF WICHITA

# 2015 Outsourced Pavement Preservation Program (OP3)


Public Works & Utilities

Maintenance Division

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# Contents

# Introduction

The City of Wichita's paved street network is comprised of more than 5,000 lane-miles of residential, collector and arterial streets and expressways, representing a total paved area in excess of 322 million square feet. In order to cost effectively maintain this vast network of assets, the City supplements the critical preventive, corrective and emergency maintenance efforts of its internal staff by leveraging the resources and expertise of private contractors. Each year outsourced pavement maintenance efforts are proposed and submitted for approval in the Outsourced Pavement Preservation Program (formerly the Contract Maintenance Program, or CMP). In order to effectively manage both internal and external pavement maintenance resources, the Public Works & Utilities (PW&U) Department has always striven to effect "the right treatment, on the right road, at the right time". But, just as socioeconomic and technological influences continue to evolve, so too does the department's approach. At present, the department is continuing its development and implementation of a project selection, evaluation, and reporting process that will be:

1. More objective, relying greater on economic measures like return on investment (ROI) and remaining service life (RSL), and less on subjective measures like "good", "satisfactory", or "poor"
2. More supportive of experimentation and less adherent to past practice
3. More likely to incorporate new technologies
4. Better able to quantify the cost of deferred maintenance
5. Better able to maximize the City's returns on future investments
6. Better able to assist in the identification of optimum funding levels

# Outsourced Pavement Preservation Program Project Selection Process

## Traditional Approach

Locations to be addressed in the Outsourced Pavement Preservation Program (OP3) have traditionally been determined using the following criteria.

### 1. Pavement Condition Index (PCI)

Every street segment in the City is reviewed and assigned a PCI number. The PCI number can range from 0 to 100, and is determined by evaluating each segment for various pavement distresses.

Traditionally, a PCI value of 70 has been considered satisfactory. Streets with PCIs below 70, and especially below 50, were formerly considered first for inclusion in the OP3. PCIs were also used to guide preventive maintenance, but only as funding allowed. (Preventive maintenance delays streets from dropping into a lower condition range, which averts significantly more costly repair.)

2. **Completion of Locations Previously Identified**
   If repairs to previously programmed locations are not able to be completed, they are typically included in the following year's OP3.

3. **Stakeholder Requests**
   Stakeholder requests are continually evaluated and prioritized against competing demands and existing commitments. Qualifying locations are addressed either in-house, or via the OP3, as resources allow.

4. **Maintenance History and Other Programs**
   Streets that have required extensive mitigation by City staff, or for which routine maintenance operations are no longer effective, also receive special consideration. Streets that are scheduled for repair or replacement via other programs, such as the Capital Improvement Program (CIP), are not included in the OP3.

Historically, OP3 expenditures were distributed equally among the City's six council districts. While not overtly a criterion, the practice was prioritized above other considerations, and thus had a profound effect on project selection.

## Enhanced Approach

As part of ongoing efforts to maximize the City's return on continued investments, several enhancements are proposed anew, or for continued exploration in 2015.

1. **Continued Emphasis on Residential Thermal Crack Repair**
   In response to customer feedback, the 2015 OP3 will continue the residential thermal crack repair effort begun in 2014. The repairs provide a low cost solution to one the City's most severe and frequently occurring residential street issues. Last year's program resolved a significant number of these distresses, but additional work remains to be done.

2. **Continued Emphasis on Preventive and Preservative Maintenance**
   While preventive maintenance has historically been programmed as funding allows; it is apparent that, in order to ensure maximum return on investment, preventive maintenance must be made a priority. Much like maintaining a functional roof over one's home, the cost to maintain a good road, in good condition, is far less than the cost to rehabilitate a failed one. For example, a preservative seal can extend the service life of a good pavement by approximately 5 years, at a cost around $1/sy, whereas milling and overlaying a bad pavement may extend the service life just 8-12 years, at a cost of $10-$15/sy. When applied to a hypothetical, quarter mile section of 4-lane arterial roadway (1 lane mile) the total cost to preservative seal the section at $1/sy would be $7,040. The total cost to mill and overlay the same section of roadway (7,040 sy) at a later date, assuming a midrange unit cost of $12/sy, would be $84,480. Assuming service lives of 5 and 10 years, respectively, one finds that it costs

just $1,408 to add one full lane-mile-year of service life by preservative sealing, while the cost to add the same one lane-mile-year of service life via mill and overlay is six times higher, at $8,448.

When one considers, again, that the City's paved street network consists of roughly 5,000 lane-miles of pavement, the financial prudence of preventive maintenance is clear. While we do not presently track overall network condition in terms of remaining service life, we know that each lane-mile has but a limited number of years remaining until the end of its useful service life. Thus, in the absence of any maintenance improvements over a one year period, we can surmise that the remaining service of each lane-mile will be reduced by one year. Applied across the entire network, this represents a total service life reduction of 5,000 lane-mile-years, each year. Pavement preservation treatments, as well as rehabilitative repairs and reconstruction, however, add service life to the network. In order to offset the annual loss, the City must add at least 5,000 lane-mile-years back to the system through its maintenance efforts each year. Any less, results in an overall decline of the network's condition. Any more, and the overall condition improves.

While the City employs numerous strategies in its approach to pavement management, for the purpose of example, we'll examine a simplified approach using four common treatments, including the two previously described, in the table below.

| Treatment | Type | Approx. Cost/SY | Approx. Service Life Extension (Years) | Lane-mile-years Needed to Maintain Status Quo | Lane Miles to be Treated | Cost to Maintain Status Quo (Using prescribed treatment alone) |
|---|---|---|---|---|---|---|
| Rejuvenating Seal | Preventive | $1 | 5 | 5000 | 1000 | $7,040,000 |
| Micro Surfacing | Preventive | $3 | 6 | 5000 | 833 | $17,592,960 |
| Mill & Overlay | Rehabilitation | $12 | 10 | 5000 | 500 | $42,240,000 |
| Asphalt Reconstruction | Reconstruction | $35 | 25 | 5000 | 200 | $49,280,000 |

While none of the above hypothetical approaches is optimized for the City's existing network, the exercise serves to illustrate three points.

1. Preventive and preservative maintenance are better financial values than extensive rehabilitation and replacement.
2. To successfully operate under the best of these scenarios – the one that serves to maximize ROI – one would need to begin with a near perfect system and repair 20% of that system each year. In reality, less than 20% of our existing system falls within the appropriate condition range for that treatment. Consequently, we must endeavor to

employ some optimum combination of treatments across the full spectrum of pavement condition.

3. The example serves to demonstrate the scale of maintenance required and alludes to the cumulative impact of deferred maintenance.

In light of the benefits, preventive and preservative maintenance have increased significantly since 2011. As demonstrated in the following table, approximately 170 lane miles will be touched by preventive/preservative maintenance in 2014, which is more than eight times the number touched in 2011.

| Year | Project | Lane Miles |
|---|---|---|
| **2011** | Preservative Seal | 7 |
| | Micro Surfacing Seal | 13 |
| | **Total** | **20** |
| **2012** | Preservative Seal | 55 |
| | Micro Surfacing Seal | 16 |
| | **Total** | **71** |
| **2013** | Preservative Seal | 80 |
| | Cape Seal | 17 |
| | Slurry Seal | 14 |
| | Micro Surfacing Seal | 13 |
| | Ecopave Surface Seal | 2 |
| | **Total** | **126** |
| **2014** | Preservative Seal | 46 |
| | Slurry Seal | 30 |
| | Micro Surfacing Seal | 21 |
| | **Total** | **97** |
| **2015** | Crack Seal | 75 |
| | Preservative Seal | 38 |
| | Slurry Seal | 8 |
| | Micro Surfacing | 49 |
| | **Total** | **170 (est.)** |

## 3. Pilot Projects

PW&U is committed to the evaluation and incorporation of new pavement maintenance strategies and techniques. Numerous pilot projects will be conducted this year, in order to further evaluate the department's developing mitigation strategy (mitigating streets in poor condition, rather than undertaking significantly more costly rehabilitation and reconstruction), as well as to test new pavement maintenance technologies. The pilot projects will consist of the following:

1. Slurry seal over a scrub seal (mitigation)
2. Micro surfacing seal over a scrub seal (mitigation)
3. Fiber reinforced micro surfacing seal (mitigation)
4. Fiber reinforced micro surfacing seal over a scrub seal (mitigation)

### 4. Investment Optimization

Ongoing economic pressures have exposed the limitations of the City's traditional use of PCI. The PCI effectively illustrates network trends, but in and of itself does not allow for an objective means of characterizing streets as "failed", "deficient", or "in need of repair". More importantly, it does not afford an objective means of quantifying the cost of deferred maintenance. In order to accurately and objectively do so, an approach other than PCI is needed.

PW&U believes the City will be best served by evaluating economic measures, rather than PCI alone. Toward that end, the department has developed a computerized investment optimization model. The model allows staff to analyze and compare various alternative maintenance approaches in terms of ROI, RSL and asset value. Using these measures, priorities, strategies and budgets may be optimized in terms of their long-term fiscal performance. Staff's evaluation of alternative approaches is ongoing and driven by the department's commitment to identify:

1. The short and long term results of the department's existing strategy and budget
2. The strategy and budget required to maintain current condition and asset values
3. The strategy and budget that results in the optimum ROI

## 2015 Outsourced Pavement Preservation Program Summary

## Definitions

### 1. Crack Seal

"Crack Seal" is an application of hot liquid rubberized asphalt material placed into or above moderately sized pavement cracks. The treatment is used to prevent moisture infiltration in order to mitigate the occurrence of further distresses and reinforce the adjacent pavement.

### 2. Concrete Repair

"Concrete repair" includes the strategic full-depth removal and replacement of concrete pavement, in order to address myriad pavement distresses, including spalling and pop-outs.

### 3. Micro Surfacing Seal and Fiber-Reinforced Micro Surfacing Seal

A "micro surfacing seal" is a mixture of relatively large aggregate, polymer modified emulsion, mineral filler and additives are combined and applied to an existing pavement using a specialized mixing and paving machine. The treatment is used to reduce water penetration, correct minor surface irregularities, improve aesthetics and extend the useful life of underlying pavement. Polyester or fiberglass fibers may be cut and added to the mix in order to enhance durability and better deter reflective cracking.

### 4. Preservative Seal

A "preservative seal" consists of the application of an emulsion specially formulated to penetrate, restore and preserve existing asphalt binders. By keeping the pavement flexible, it serves to seal against water intrusion, inhibit oxidation and improve aggregate retention.

### 5. Scrub Seal

A "scrub seal" is constructed by spraying emulsified asphalt onto an existing pavement, dragging a broom across the surface to scrub the emulsified asphalt into the surface cracks, spreading aggregate over the emulsified asphalt, and rolling the surface with a roller. The treatment is used to quickly and affordably crack fill streets with extensive surface cracking.

### 6. Slurry Seal

A "slurry seal" is a basic surface sealing procedure in which a thin layer of fine graded aggregate, asphalt emulsion (as a binder) and mineral fillers is applied to the pavement. Its primary purpose is to retard water penetration, restore moderate to severe aggregate loss, improve aesthetics and extend the service life of the underlying pavement.

### 7. Thermal Crack Repair

"Thermal crack repair" consists of repairing large cracks in full-depth asphalt pavements by removing the top two inches of pavement and installing a pavement interlayer reinforcement system beneath a new layer of asphalt. The interlayer reinforcement deters the crack from reflecting back through the renewed surface.

## Proposed Expenditures

Proposed 2015 outsourced pavement preservation expenditures total $8 million. Funds totaling $4.0 million are included in the 2015 Adopted Public Works & Utilities General Fund operating budget for Pavement Maintenance. The remaining $4 million for 2015 will be funded with GO at-large bonds and is included in the 2011-2020 Adopted Capital Improvement Program (CIP).

**Network Funding/Expenditures Summary**

| Funding | Expenditures | Percentage |
|---|---|---|
| **General Fund ($4 million)** | | |
| Micro Surfacing Seal (mitigation pilots) | $1,923,000 | 24.0% |
| Thermal Crack Repair | $440,000 | 5.5% |
| Contingency | $400,000 | 5.0% |
| Crack Seal | $375,000 | 4.7% |
| Preservative Seal | $318,000 | 4.0% |
| Engineering Salaries & Overhead | $298,000 | 3.7% |
| Slurry Seal (mitigation pilots) | $246,000 | 3.1% |
| **CIP ($4 million)** | | |
| Thermal Crack Repair | $3,012,000 | 37.6% |
| Concrete Street Repair | $533,000 | 6.7% |
| Engineering Salaries & Overhead | $455,000 | 5.7% |
| **Total Funding** | **$8,000,000** | **100.0%** |

## District Expenditures Summary

| Project | District | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Thermal Crack Repair | $320,000 | $709,000 | $125,000 | $443,000 | $1,606,000 | $249,000 |
| Micro Surfacing Seal | $365,000 | $123,000 | $553,000 | $128,000 | $0 | $754,000 |
| Concrete Street Repair | $343,000 | $0 | $60,000 | $130,000 | $0 | $0 |
| Crack Seal | $82,000 | $21,000 | $91,000 | $156,000 | $0 | $25,000 |
| Preservative Seal | $18,000 | $76,000 | $31,000 | $186,000 | $0 | $7,000 |
| Slurry Seal | $0 | $228,000 | $0 | $0 | $18,000 | $0 |
| Engineering OH/Salary | $124,000 | $127,000 | $96,000 | $115,000 | $176,000 | $115,000 |
| Contingency | $67,000 | $66,000 | $67,000 | $67,000 | $66,000 | $67,000 |
| **Total Expenditures** | **$1,319,000** | **$1,350,000** | **$1,023,000** | **$1,225,000** | **$1,866,000** | **$1,217,000** |
| % of Total Expenditures | 16.5% | 16.9% | 12.8% | 15.3% | 23.3% | 15.2% |
| % of Total Paved Network in District | 17.8% | 17.9% | 14.4% | 17.8% | 14.9% | 17.2% |

## Network Impact Summary

| Project | Total Square Yards | Linear Feet | Arterial Lane Miles | Residential Lane Miles | Total Lane Miles |
|---|---|---|---|---|---|
| Thermal Crack Repair | N/A | 207,446 | 15.44 | 273.87 | 289.31 |
| Crack Seal | N/A | 499,546 | 65.40 | 9.31 | 74.70 |
| Micro Surfacing Seal | 345,666 | N/A | 14.70 | 34.40 | 49.10 |
| Preservative Seal | 265,198 | N/A | 28.58 | 9.09 | 37.67 |
| Slurry Seal | 56,643 | N/A | 0.00 | 8.05 | 8.05 |
| Concrete Street Repair | 11,150 | N/A | 0.76 | 3.62 | 4.37 |
| **Totals** | **678,658** | **706,992** | **124.88** | **338.34** | **463.20** |

## Proposed Locations

| District I | | | |
|---|---|---|---|
| **STREET** | **FROM** | **TO** | **PROJECT** |
| **E 26TH ST N** | N VOLUTSIA AVE | N CHAUTAUQUA AVE | Concrete Repair |
| **E CHARRON ST** | WEST OF N BLUFF ST | EOP* | Concrete Repair |
| **N ERIE AVE** | E 26TH ST N | E 27TH ST N | Concrete Repair |
| **N FARMSTEAD ST** | E 17TH ST N | E 19TH ST N | Concrete Repair |
| **N SIEFKIN ST** | E 17TH ST N | N BEAUMONT ST | Concrete Repair |
| **N YALE AVE** | E 21ST ST N | N YALE AVE | Concrete Repair |
| **E 20TH ST N** | N OLD MANOR RD | N PARKWOOD LN | Crack Seal |
| **E 22ND ST N** | N ROOSEVELT AVE | N GENTRY DR | Crack Seal |
| **E 24TH ST N** | E 24TH ST N | N YALE AVE | Crack Seal |
| **E 29TH ST N** | N WOODLAWN BLVD | N OLIVER AVE | Crack Seal |
| **N BATTIN AVE** | E SHADYBROOK LN | E 21ST ST N | Crack Seal |
| **N BEAUMONT ST** | E 19TH ST N | E 20TH ST N | Crack Seal |
| **N BLUFF AVE** | E CHARRON ST | E CHRISTY PL | Crack Seal |
| **S BROADWAY AVE** | DOUGLAS | DEWEY | Crack Seal |
| **E CENTRAL AVE** | N WOODLAWN BLVD | N OLIVER AVE | Crack Seal |
| **N EDGEMOOR DR** | E 3RD ST N | E CENTRAL AVE | Crack Seal |
| **N FAIRMOUNT AVE** | E 25TH ST N | E 26TH ST N | Crack Seal |
| **N GENTRY DR** | E 25TH ST N | SOUTH OF E 22ND ST N | Crack Seal |
| **N OLD MANOR ST** | E 21ST ST N | N RIDGEWOOD ST | Crack Seal |
| **E ENGLISH ST** | S HYDRAULIC AVE | S MINNESOTA AVE | Micro Surfacing |
| **E GILTNER CIR** | S HYDRAULIC AVE | EOP* | Micro Surfacing |
| **N HILLSIDE AVE** | E 45TH ST N | E 37TH ST N | Micro Surfacing |
| **N KANSAS AVE** | E WATERMAN ST | E 3RD ST N | Micro Surfacing |
| **E LEWIS CIR** | S HYDRAULIC AVE | EOP* | Micro Surfacing |
| **E MCKNIGHT DR** | S HYDRAULIC AVE | E WATERMAN ST | Micro Surfacing |
| **E MILDRED AVE** | N HYDRAULIC AVE | N KANSAS AVE | Micro Surfacing |
| **S MINNEAPOLIS AVE** | E DOUGLAS AVE | E WATERMAN ST | Micro Surfacing |
| **E MURDOCK AVE** | N CLEVELAND AVE | N WASHINGTON AVE | Micro Surfacing |
| **E VICTOR ST** | N HYDRAULIC AVE | N KANSAS AVE | Micro Surfacing |
| **E WATERMAN ST** | S HYDRAULIC AVE | E MCKNIGHT DR | Micro Surfacing |
| **N WOODLAWN BLVD** | E CENTRAL AVE | E WILLOWBROOK RD | Micro Surfacing |
| **E 17TH ST N** | N HILLSIDE AVE | N GROVE AVE | Preservative Seal |
| **N HILLSIDE AVE** | E 17TH ST N | E 18TH ST N | Preservative Seal |
| **N CARRIAGE PKY** | E CENTRAL AVE | N EDGEMOOR ST | Thermal Crack Repair |
| **AREA BOUNDED BY K-96, E 21ST ST N, N OLIVER AVE, AND I-135** | | | Thermal Crack Repair |
| **W HALF OF AREA BOUNDED BY E 29TH ST N, E 21ST ST S, N ROCK RD, AND N WOODLAWN ST** | | | Thermal Crack Repair |

*EOP - End of Pavement

## District II

| STREET | FROM | TO | PROJECT |
|---|---|---|---|
| **E BELLECHASE CT** | S 127TH ST E | BELLECHASE CT E OF | Crack Seal |
| **E GILBERT ST** | S 127TH ST E | EOP* E OF E GILBERT CT | Crack Seal |
| **S GLEN WOOD ST** | E LAGUNA ST | EOP* | Crack Seal |
| **S HORSEBACK CIR** | E BELLECHASE ST | EOP* N OF E SPRING VALLEY ST | Crack Seal |
| **E LAGUNA ST** | S PECKHAM ST | E LAGUNA CIR | Crack Seal |
| **E LAGUNA CIR** | E LAGUNA ST | EOP* | Crack Seal |
| **S PECKHAM ST** | E GILBERT ST | E LAGUNA ST | Crack Seal |
| **S SIERRA HILLS ST** | E LAGUNA ST | E LAGUNA ST | Crack Seal |
| **E SPRING VALLEY ST** | S 127TH ST E | EOP* E OF HORSEBACK ST | Crack Seal |
| **S 127TH ST E** | E KELLOGG AVE | E HARRY ST | Micro Surfacing |
| **S GREENWICH RD** | E KELLOGG DR S | E OSIE ST | Preservative Seal |
| **E HARRY ST** | S SMITHMOOR ST | S GREENWICH RD | Preservative Seal |
| **E HARRY ST** | S ROCK RD | E HARRY CT | Preservative Seal |
| **E HARRY ST** | S LONGFELLOW LN | E HARRY CT | Preservative Seal |
| **E CLARK ST** | E MT VERNON ST | S CRANBROOK AVE | Slurry Seal |
| **E COUNTRYSIDE ST** | S RED OAKS ST | EOP* E OF S CRANBROOK AVE | Slurry Seal |
| **S CRANBROOK AVE** | E HARRY ST | E CLARK ST | Slurry Seal |
| **E FUNSTON ST** | S RED OAKS ST | EOP* E OF S CRANBROOK AVE | Slurry Seal |
| **LOCKMOOR** | S RED OAKS ST | S CRANBROOK AVE | Slurry Seal |
| **E MOUNT VERNON** | S STONEYBROOK ST | EOP* E OF S CRANBROOK AVE | Slurry Seal |
| **E OSIE CIR** | S CRANBROOK AVE | EOP* | Slurry Seal |
| **S RED OAKS ST** | E HARRY ST | E COUNTRYSIDE ST | Slurry Seal |
| **E SKINNER ST** | E MT VERNON ST | EOP* E OF S CRANBROOK AVE | Slurry Seal |
| **S STONEYBROOK ST** | E CLARK ST | E KINKAID ST | Slurry Seal |
| **S 127TH ST E** | E DOUGLAS AVE | E CENTRAL AVE | Thermal Crack Repair |
| **N 143RD ST E** | E 21ST N | E 24TH ST N | Thermal Crack Repair |
| **N CLAY CIR** | E 2ND ST | EOP* | Thermal Crack Repair |
| **N CREST CIR** | E 2ND ST N | EOP* | Thermal Crack Repair |
| **N DOWELL ST** | 2ND ST N | E CENTRAL AVE | Thermal Crack Repair |
| **N ELLSON ST** | N ELLSON CT | E CENTRAL AVE | Thermal Crack Repair |
| **E FUNSTON ST** | S ROCK RD | S LONGFELLOW CIR | Thermal Crack Repair |
| **S LONGFELLOW CIR** | E HARRY ST | EOP* | Thermal Crack Repair |
| **E OSIE ST** | S ROCK RD | S LONGFELLOW CIR | Thermal Crack Repair |
| **E HALF OF THE AREA BOUNDED BY E 29TH ST N, E 21ST ST N, N ROCK RD, AND N WOODLAWN ST** | | | Thermal Crack Repair |
| **AREA BOUNDED BY E 21ST ST N, E 13TH ST N, N ROCK RD, AND N WOODLAWN ST** | | | Thermal Crack Repair |
| **N HALF OF THE AREA BOUNDED BY E 13TH ST N, E CENTRAL AVE, N ROCK RD, AND N WOODLAWN ST** | | | Thermal Crack Repair |
| **AREA BOUNDED BY E 13TH ST N, E CENTRAL AVE, N WEBB RD, AND N ROCK RD** | | | Thermal Crack Repair |
| **QUARTER SECTION SE OF N ROCK RD AND E CENTRAL AVE** | | | Thermal Crack Repair |
| **AREA BOUNDED BY E HARRY ST, E PAWNEE ST, S WEBB RD, AND S ROCK RD** | | | Thermal Crack Repair |
| **AREA BOUNDED BY E PAWNEE ST, S CITY LIMITS, S WEBB RD, AND S ROCK RD** | | | Thermal Crack Repair |

*EOP - End of Pavement

## District III

| STREET | FROM | TO | PROJECT |
|---|---|---|---|
| **S ERIE AVE** | E STAFFORD ST | E PAWNEE AVE | Concrete Repair |
| **E SKINNER ST** | S GROVE ST | S GREEN ST | Concrete Repair |
| **E 63RD ST S** | S HYDRAULIC AVE | S GROVE ST | Crack Seal |
| **S BLUFFVIEW DR** | E MENLO DR | WILMA ST | Crack Seal |
| **E HARRY ST** | S OLIVER AVE | S PARKWOOD LN | Crack Seal |
| **E HARRY ST** | S ROANOKE DR | S WOODLAWN ST | Crack Seal |
| **S HYDRAULIC AVE** | E 55TH ST S | E 68TH ST S | Crack Seal |
| **E MONA LN** | S HYDRAULIC AVE | S SPRUCE AVE | Crack Seal |
| **S OLIVER AVE** | E HIGHLAND LN | E FUNSTON ST | Crack Seal |
| **E BLAKE ST** | ELPYCO ST | S PINECREST ST | Micro Surfacing |
| **S BLUFF AVE** | E 31ST ST S | EOP* | Micro Surfacing |
| **S GEORGE WASHINGTON** | E 31ST ST S | EOP* | Micro Surfacing |
| **S GREENWAY BLVD** | E WASSALL ST | EOP* | Micro Surfacing |
| **E HODSON ST** | S HYDRAULIC AVE | S MINNEAPOLIS AVE | Micro Surfacing |
| **S KANSAS AVE** | E NORTHERN ST | E INDUSTRIAL AVE | Micro Surfacing |
| **S KANSAS AVE** | E HODSON ST | E STAFFORD ST | Micro Surfacing |
| **S LULU AVE** | E GRABER ST | E WASSALL ST | Micro Surfacing |
| **S MEAD AVE** | E WASSALL ST | S GREENWAY BLVD | Micro Surfacing |
| **S MINNEAPOLIS AVE** | S MINNESOTA AVE | E HODSON ST | Micro Surfacing |
| **S MINNESOTA AVE** | S MINNEAPOLIS AVE | E STAFFORD ST | Micro Surfacing |
| **E NAVAJO ST** | S BLUFF AVE | S BLUFF AVE | Micro Surfacing |
| **E ROSEBERRY CT** | E ROSEBERRY ST | EOP* | Micro Surfacing |
| **S SANTA FE AVE** | E WASSALL ST | S GREENWAY BLVD | Micro Surfacing |
| **E SCOTT AVE** | S IDA AVE | S LAURA AVE | Micro Surfacing |
| **E STAFFORD ST** | E STAFFORD CT | S SWAN AVE | Micro Surfacing |
| **S VICTORIA AVE** | E SCOTT AVE | E MARION ST | Micro Surfacing |
| **AREA BOUNDED BY E MT VERNON ST, E PAWNEE ST, S OLIVER ST, AND GEORGE WASHINGTON BLVD S** | | | Micro Surfacing |
| **S ASH AVE** | E 50TH ST S | E 53RD ST S | Preservative Seal |
| **S KANSAS AVE** | E 50TH ST S | E MONA LN | Preservative Seal |
| **AREA BOUNDED BY GEORGE WASHINGTON BLVD S, S OLIVER ST, AND E 31ST ST S** | | | Preservative Seal |
| **E BAYLEY ST** | S WAVERLY ST | PRAIRIE PARK RD | Thermal Crack Repair |
| **BRENTWOOD ST** | E MT VERNON ST | E CLARK ST | Thermal Crack Repair |
| **CASTLE DR** | S CHRISTINE AVE | S FABRIQUE DR | Thermal Crack Repair |
| **DUNKIN ST** | FEE S | DAVIDSON ST | Thermal Crack Repair |
| **JEWETT S** | E ROSS PKWY | FEES S | Thermal Crack Repair |
| **LEXINGTON RD** | CASTLE DR | S FABRIQUE DR | Thermal Crack Repair |
| **E MT VERNON ST** | S GROVE ST | S HILLSIDE ST | Thermal Crack Repair |
| **PRAIRIE PARK RD** | CASTLE DR | E BAYLEY ST | Thermal Crack Repair |

*EOP - End of Pavement

## District IV

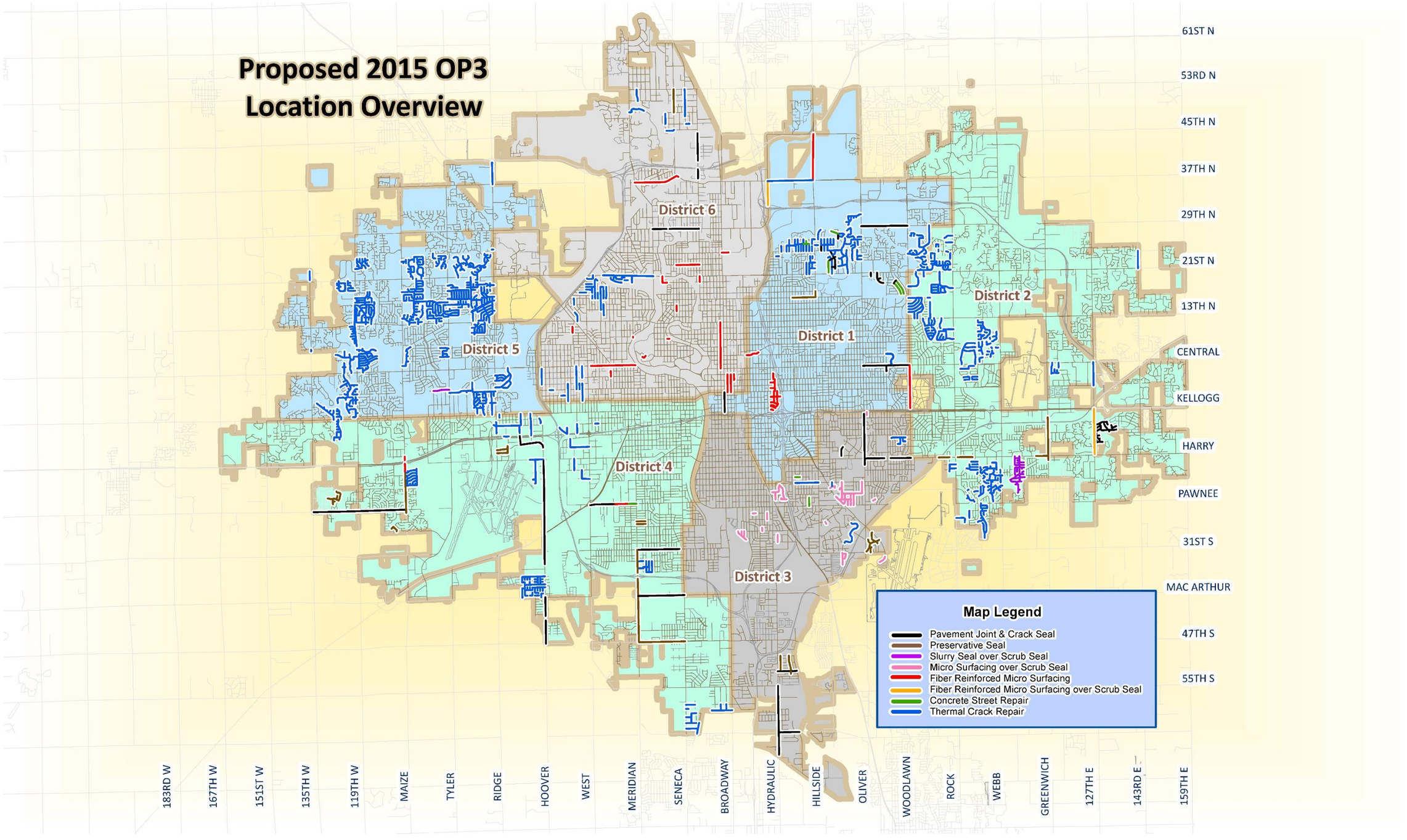
| STREET | FROM | TO | PROJECT |
|---|---|---|---|
| **W PAWNEE AVE** | S MERIDIAN AVE | S EDWARDS AVE | Concrete Repair |
| **W 31ST ST S** | S SENECA ST | S MERIDIAN AVE | Crack Seal |
| **S DUGAN RD** | W PUEBLO DR | W KELLOGG DR | Crack Seal |
| **S HOOVER ST** | W HARRY ST | W 34TH ST S | Crack Seal |
| **S HOOVER ST** | W MACARTHUR RD | CITY LIMIT S OF W 42ST | Crack Seal |
| **S HOOVER ST** | CITY LIMIT S OF W 42ST | W 47TH ST S | Crack Seal |
| **W MACARTHUR RD** | S SENECA ST | S MERIDIAN AVE | Crack Seal |
| **W PAWNEE AVE** | S SHERIDAN AVE | S WEST ST | Crack Seal |
| **W PAWNEE AVE** | S MAIZE RD | S 135TH ST W | Crack Seal |
| **W PUEBLO DR** | S HOOVER ST | S DUGAN RD | Crack Seal |
| **S MAIZE RD** | RINGER ST | W MERTON ST | Micro Surfacing |
| **W PAWNEE AVE** | S SHERIDAN AVE | S EDWARDS AVE | Micro Surfacing |
| **W 47TH ST S** | S SENECA ST | S MERIDIAN AVE | Preservative Seal |
| **W CASADO ST** | S EVERETT AVE | S MERIDIAN AVE | Preservative Seal |
| **W GRANT ST** | S WHEATLAND ST | EOP* | Preservative Seal |
| **W GREENFIELD ST** | S EVERETT AVE | S MERIDIAN AVE | Preservative Seal |
| **S LIMUEL ST** | W GRANT ST | EOP* | Preservative Seal |
| **S MAIZE RD** | W MERTON ST | S DENENE ST | Preservative Seal |
| **W MARIPOSA LN** | S SIERRA DR | S RIDGE RD | Preservative Seal |
| **S MERIDIAN AVE** | I-235 RAMP | W 47TH ST S | Preservative Seal |
| **S MERIDIAN AVE** | I-235 RAMP | W 31ST ST S | Preservative Seal |
| **S MERIDIAN AVE** | W MACARTHUR RD | W 43RD ST S | Preservative Seal |
| **W PUEBLO DR** | S SIERRA DR | S RIDGE RD | Preservative Seal |
| **S SIERRA DR** | W MARIPOSA LN | N TO EOP* | Preservative Seal |
| **S WESTGATE ST** | W YOSEMITE ST | EOP* | Preservative Seal |
| **S WHEATLAND ST** | S WHEATLAND CT | W GRANT ST | Preservative Seal |
| **W YOSEMITE ST** | S WESTGATE ST | S LARK LN | Preservative Seal |
| **FIREFLY ST** | W MAPLE ST | W HENDRYX AVE | Thermal Crack Repair |
| **W HENDRYX ST** | FIREFLY ST | S LIMUEL ST | Thermal Crack Repair |
| **TAFT ST** | S ILLINOIS ST | MCCOMAS S | Thermal Crack Repair |
| **TAFT ST** | FIREFLY ST | S WHEATLAND ST | Thermal Crack Repair |
| **S WHEATLAND ST** | TAFT ST | W HENDRYX AVE | Thermal Crack Repair |
| **AREA BOUNDED BY S MAIZE RD, S CARRWOOD DR, W MAY ST, AND W MERTON ST** | | | Thermal Crack Repair |
| **AREA BOUNDED BY S HOOVER RD, S RIDGE RD, W MAPLE ST, AND W KELLOGG AVE** | | | Thermal Crack Repair |
| **AREA BOUNDED BY TAFT ST, W MAY ST, I-235, AND S WEST ST** | | | Thermal Crack Repair |
| **AREA BOUNDED BY W 33RD ST, W 35TH ST S, S MERIDIAN AVE, AND S BONN ST** | | | Thermal Crack Repair |
| **AREA BOUNDED BY W 35TH ST S, W MACARTHUR RD, DUGAN AVE, AND S HOOVER RD** | | | Thermal Crack Repair |

*EOP - End of Pavement

## District V

| STREET | FROM | TO | PROJECT |
|---|---|---|---|
| **W ROLLING HILLS DR** | N TYLDER ROAD | N WESTFIELD ST | Slurry Seal |
| **W 2ND ST N** | N TYLER RD | N WOODCHUCK ST | Thermal Crack Repair |
| **W 9TH ST N** | N TYLER RD | N WADDINGTON AVE | Thermal Crack Repair |
| **N 119TH ST W** | W 17TH ST N | S TO COWSKIN CREEK | Thermal Crack Repair |
| **N 135TH ST W** | W 21ST ST N | N FOREST VIEW ST | Thermal Crack Repair |
| **N 135TH ST W** | LOST CREEK | S TO CITY LIMIT | Thermal Crack Repair |
| **BEKEMEYER ST** | N TYLER RD | N WADDINGTON AVE | Thermal Crack Repair |
| **W BIRCH LN** | BEKEMYER ST | N WOOD AVE | Thermal Crack Repair |
| **W BIRCH LN** | N TOH-N-HAH TRAIL | N CRESTLINE ST | Thermal Crack Repair |
| **CINDY LN** | N TOH-N-HAH TRAIL | N CRESTLINE ST | Thermal Crack Repair |
| **W REFLECTION RD** | N RIDGE RD | N WILD ROSE ST | Thermal Crack Repair |
| **N RIDGE RD** | W 37TH ST N | K-96 | Thermal Crack Repair |
| **W SQUAW LN** | N MAIZE RD | N TOH-N-HAH TRAIL | Thermal Crack Repair |
| **W SUNCREST ST** | N TOH-N-HAH TRAIL | N VALLEYVIEW ST | Thermal Crack Repair |
| **N TOH-N-HAH TRAIL** | W SQUAW LN | W SUNCREST ST | Thermal Crack Repair |
| **N WOOD AVE** | BEKEMEYER ST | W 9TH ST N | Thermal Crack Repair |
| **N WOODCHUCK ST** | W 2ND ST N | N COUNTRY ACRES AVE | Thermal Crack Repair |
| **AREA BOUNDED BY W 13TH ST N, W 21ST ST N, N RIDGE RD, AND N TYLER** | | | Thermal Crack Repair |
| **SOUTH HALF OF AREA BOUNDED BY W 21ST N, W 29TH ST N, N RIDGE RD, AND N TYLER RD** | | | Thermal Crack Repair |
| **QUARTER SECTION NW OF W 13TH ST N AND N TYLER RD** | | | Thermal Crack Repair |
| **QUARTER SECTION NE OF W 13TH ST N AND N MAIZE RD** | | | Thermal Crack Repair |
| **QUARTER SECTION SE OF W 21ST N AND N MAIZE RD** | | | Thermal Crack Repair |
| **QUARTER SECTION NE OF W 21ST N AND N MAIZE RD** | | | Thermal Crack Repair |
| **QUARTER SECTION NE OF W CENTRAL AVE AND N 119TH ST WEST** | | | Thermal Crack Repair |
| **QUARTER SECTION NW OF W CENTRAL AVE AND N 119TH ST WEST** | | | Thermal Crack Repair |
| **QUARTER SECTION SW OF W CENTRAL AVE AND N 119TH ST WEST** | | | Thermal Crack Repair |
| **QUARTER SECTION NW OF WMAPLE ST AND N 119TH ST W** | | | Thermal Crack Repair |
| **QUARTER SECTION NE OF W 13TH ST N AND N 119TH ST W** | | | Thermal Crack Repair |
| **QUARTER SECTION SW OF W 13TH ST N AND N 119TH ST W** | | | Thermal Crack Repair |
| **QUARTER SECTION SW OF W 21ST ST N AND N 119TH ST W** | | | Thermal Crack Repair |
| **QUARTER SECTION NE OF W 21ST ST N AND N 119TH ST W** | | | Thermal Crack Repair |
| **QUARTER SECTION SE OF W 21ST ST N AND N 119TH ST W** | | | Thermal Crack Repair |
| **QUARTER SCTION NE OF W MAPLE ST AND N 135TH ST W** | | | Thermal Crack Repair |
| **QUARTER SECTION NW OF W 21ST ST N AND N TYLER RD** | | | Thermal Crack Repair |
| **QUARTER SECTION SW OF W 13TH ST N AND N RIDGE RD** | | | Thermal Crack Repair |
| **QUARTER SECTION SE OF W CENTRAL AVE AND N RIDGE RD** | | | Thermal Crack Repair |
| **QUARTER SECTION NW OF W MAPLE ST AND N RIDGE RD** | | | Thermal Crack Repair |

| District VI | | | |
|---|---|---|---|
| **STREET** | **FROM** | **TO** | **PROJECT** |
| **E 29TH ST** | N BROADWAY ST | N OHIO ST | Concrete Repair |
| **W 29TH ST N** | N ARKANSAS AVE | N AMIDON AVE | Crack Seal |
| **N ARKANSAS AVE** | W 38TH ST N | K-96 | Crack Seal |
| **N ARKANSAS AVE** | BRIDGE S OF W 41ST ST | N OF W 45TH ST N | Crack Seal |
| **W 20TH ST N** | N PORTER AVE | N WOODROW AVE | Micro Surfacing |
| **W 23RD ST N** | N ARKANSAS AVE | N PAYNE AVE | Micro Surfacing |
| **E 25TH ST N** | N BROADWAY AVE | E 25TH ST N | Micro Surfacing |
| **W 37TH ST N** | N WOMER ST | LITTLE ARKANSAS RIVER | Micro Surfacing |
| **N ARKANSAS AVE** | W 20TH ST N | W 21ST ST N | Micro Surfacing |
| **W BRIGGS AVE** | N RIVER BLVD | N PORTER AVE | Micro Surfacing |
| **W CENTRAL AVE** | N MCLEAN BLVD | PAVEMENT CHANGE E | Micro Surfacing |
| **N DOUGHERTY AVE** | W 11TH ST N | W 12TH ST N | Micro Surfacing |
| **N EMPORIA AVE** | E DOUGLAS AVE | E 3RD ST N | Micro Surfacing |
| **N HOOD AVE** | W 15TH ST N | W 16TH ST N | Micro Surfacing |
| **N HYDRAULIC AVE** | K96 RAMP | E 37TH ST N | Micro Surfacing |
| **N MARKET ST** | E CENTRAL AVE | E 13TH ST N | Micro Surfacing |
| **W MURDOCK AVE** | W MURDOCK AVE | NEW PAVEMENT | Micro Surfacing |
| **N SAINT FRANCIS AVE** | E 2ND ST N | E 3RD ST N | Micro Surfacing |
| **N SHERIDAN AVE** | W SAINT LOUIS AVE | W NEWELL ST | Micro Surfacing |
| **N TOPEKA AVE** | E DOUGLAS AVE | E 3RD ST N | Micro Surfacing |
| **N WOODROW AVE** | W 20TH ST N | W 21ST ST N | Micro Surfacing |
| **N SENECA AVE** | W 49TH ST N | W 53RD ST N | Preservative Seal |
| **W 21ST ST N** | N AMIDON AVE | N MCLEAN | Thermal Crack Repair |
| **N 46TH ST** | ALEXANDER | N SENECA ST | Thermal Crack Repair |
| **W 47TH ST N** | N JEANETTE AVE | N ARMSTRONG DR | Thermal Crack Repair |
| **N ARMSTRONG AVE** | W RYNDER LN | W 53RD ST N | Thermal Crack Repair |
| **N BISON AVE** | W 47TH ST N | W 49TH ST N | Thermal Crack Repair |
| **W HARBORLIGHT ST** | N MERIDIAN AVE | W HARBORLIGHT CT | Thermal Crack Repair |
| **N ST CLAIR ST** | W 51ST ST N | W 53RD ST N | Thermal Crack Repair |
| **AREA BOUNDED BY W21ST ST N, W RIVER PARK DR, N MERIDIAN AVE, AND W RIVER PARK DR** | | | Thermal Crack Repair |
| **AREA BOUNDED BY W 21ST ST N, N WESTDALE, N SHERIDAN ST, W 13TH ST** | | | Thermal Crack Repair |
| **AREA BOUNDED BY N WEST ST, N HOOVER RD, W DOUGLAS AVE, AND W CENTRAL AVE** | | | Thermal Crack Repair |


Proposed 2015 OP3
Location Overview
District 6
District 5
District 1
District 2
District 4
District 3
61ST N
53RD N
45TH N
37TH N
29TH N
21ST N
13TH N
CENTRAL
KELLOGG
HARRY
PAWNEE
31ST S
MAC ARTHUR
47TH S
55TH S
183RD W
167TH W
151ST W
135TH W
119TH W
MAIZE
TYLER
RIDGE
HOOVER
WEST
MERIDIAN
SENECA
BROADWAY
HYDRAULIC
HILLSIDE
OLIVER
WOODLAWN
ROCK
WEBB
GREENWICH
127TH E
143RD E
159TH E
Map Legend
Pavement Joint & Crack Seal
Preservative Seal
Slurry Seal over Scrub Seal
Micro Surfacing over Scrub Seal
Fiber Reinforced Micro Surfacing
Fiber Reinforced Micro Surfacing over Scrub Seal
Concrete Street Repair
Thermal Crack Repair