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# Scope of Work

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<b>To:</b> Jeff Pearson, PE, Civil Engineer	<b>Date:</b> March 4 <sup>th</sup> , 2014
<b>From:</b> Zac Thomason, MBA, Client Services Manager	<b>Project:</b> City of Eules Pavement Management Analysis & Asset Management Inventory
<b>Subject:</b> Project Scope of Work	<b>Project No:</b> N/A

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IMS Infrastructure Management Services is pleased to submit this scope of services document in reference to the 2014 Pavement Management Analysis and Asset Management Inventory project. As discussed, a scope of services has been developed from the request for qualifications document and a budget has been provided below. The subsequent pages of this document will highlight each task in the budget and will define the associated activities and deliverables.

## City of Eules - 2014 Pavement Data Collection

Task	Activity	Quant	Units	Unit Rate	Total
<b>Project Initiation</b>					
1	Project Initiation	1	LS	\$3,000.00	\$3,000
2	Network Referencing & GIS Linkage	170	T-Mi	\$22.50	\$3,821
<b>Field Surveys</b>					
3	RST Mobilization/Calibration	1	LS	\$3,000.00	\$3,000
4	RST Field Data Collection (2 Pass Test on Arterial & Collector Roads)	170	T-Mi	\$114.00	\$19,357
5	Collect Crossfall, Radius of Curvature, and Grade	170	T-Mi	\$12.00	\$2,038
<b>Data Management</b>					
6	Data QA/QC, Processing, & Formatting	170	T-Mi	\$25.00	\$4,245
7	Pavement Data Load & Supply (Excel, Shapefile, KML)	1	LS	\$2,500.00	\$2,500
8	Pavement Analysis, Report, & City Staff Presentation	1	LS	\$10,500.00	\$10,500
9	Project Management	1	LS	\$3,540.00	\$3,540
<b>Project Total:</b>					<b>\$52,000</b>

## Optional Service Items and Activities

10	Dynalect Mobilization & Calibration	1	LS	\$2,500.00	\$2,500.00
11	Deflection Testing (2 Pass Test on Arterial & Collector Roads)	72	T-Mi	\$130.00	\$9,308.00
12	GPR Testing & Analysis - 170 Survey Miles	1	LS	\$42,500.00	\$42,500.00
13	GPR Testing & Analysis - 72 Survey Miles	1	LS	\$24,134.00	\$24,134.00
14	GPR Testing & Analysis - 15 Survey Miles	1	LS	\$12,800.00	\$12,800.00
15	Annual Report Updates (PCI & Budget Spreadsheets)	1	LS	\$3,500.00	\$3,500.00
16	City Council Presentation	1	LS	\$3,000.00	\$3,000.00
17	Browser Based Viewing Software	1	LS	\$7,000.00	\$7,000.00
18	Supply of Digital Images at 25-foot Intervals (Per View)	170	T-Mi	\$15.00	\$2,547.00
19	Asset Data Collection (GPS & Camera Configuration)	170	T-Mi	\$20.00	\$3,396.00
	a. Sidewalk Database Development	170	T-Mi	\$55.00	\$9,339.00
	b. Curb & Gutter Database Development	170	T-Mi	\$45.00	\$7,641.00
	c. Sign & Support Database Development	170	T-Mi	\$90.00	\$15,282.00
	d. ADA Ramp Database Development	170	T-Mi	\$60.00	\$10,188.00

<b>Task</b>	<b>Description</b>	<b>Activities</b>	<b>Deliverables</b>
<b>Project Initiation:</b>			
1.	Project Initiation	<ul style="list-style-type: none"> <li>• Conduct meeting confirming scope, extent and content of surveys, set milestones, and deliverables.</li> <li>• Confirm key contacts, roles and responsibilities, and project documentation.</li> <li>• Identify location of key data elements such as traffic data, GIS, existing roadway inventories, and pavement management data.</li> <li>• Identify deficient data and the means to obtain it.</li> <li>• Confirm phases of the work and invoicing methodology.</li> </ul>	Technical memo detailing scope of work, budget and deliverables.
2.	Network Referencing & GIS Linkage	<ul style="list-style-type: none"> <li>• Using the City's GIS centerline topology, develop a network wide roadway inventory suitable for use in the development of a pavement management program.</li> <li>• Include street number and block order in referencing.</li> <li>• Review existing segmentation and recommend updates.</li> <li>• Link each segment to its parent GIS section.</li> <li>• Obtain roadway attributes from GIS for functional class, traffic, width, length, pavement type, curb type, etc. If not available, devise plan to obtain them.</li> <li>• Develop survey maps for use by the RST and client review.</li> </ul>	Survey maps and inventory for use during the survey.
<b>Field Surveys:</b>			
3.	RST Mobilization & Calibration	<ul style="list-style-type: none"> <li>• Mobilize surface distress, roughness, and rutting testing equipment to project.</li> <li>• Demonstrate the equipment to the City.</li> <li>• Calibrate equipment.</li> </ul>	Equipment calibration results
4.	RST Field Data Collection	<ul style="list-style-type: none"> <li>• On all arterials and collectors, complete 2 pass testing collecting up to 9 ASTM D6433 distresses and attributes at 100-foot intervals on a block by block basis.</li> <li>• Local roadways will be surveyed in a single pass.</li> <li>• IMS will survey approximately 170 miles of roadway based upon 134 centerline miles.</li> </ul>	Survey 170 miles with Laser RST technology.

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| 5. | Collect Crossfall, Radius of Curvature, & Grade | <ul style="list-style-type: none"> <li>• Survey all arterials and collectors in two passes while single pass testing the local roadway network.</li> <li>• Cross slope, radius of curvature and grade are measured with a patented road geometric pack that is integrated with the RST system.</li> </ul> | Collection of roadway geometrics. |
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**Data Management:**

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| 6. | Data QA/QC, Processing, & Formatting | <ul style="list-style-type: none"> <li>• Develop exceptions report for lengths that do not match GIS.</li> <li>• For each data stream (surface distress, roughness, structural, GPS), aggregate and process the data at the segment level.</li> <li>• Develop individual index scores for surface distress, structural (if deflection testing is completed), and roughness as appropriate.</li> <li>• Develop an overall condition score for each section.</li> <li>• Shape files of the processed data.</li> <li>• Complete QA of data.</li> </ul> | Excel spreadsheet of the sectional data and index values. |
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| 7. | Pavement Data Load & Supply (Excel, Shapefile, and KML) | <ul style="list-style-type: none"> <li>• Assemble and load the surface and structural (optional data stream) condition data into the IMS pavement management program for analysis purposes.</li> <li>• No software is being supplied as a part of this contract and all data will be supplied in Excel, Access, Shape file, or Google Earth KML format.</li> <li>• Pavement data load is for internal analysis procedures only.</li> </ul> | Data will delivered in Excel, Access, Shapefile, or Google Earth format. |
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| 8. | Pavement Analysis, Report, & City Staff Presentation | <p>Develop the intelligence that drives rehabilitation and maintenance selection on each roadway.</p> <ul style="list-style-type: none"> <li>• Develop deterioration models for load during pavement analysis.</li> <li>• Review PCI thresholds, strength indexes, functional classification, and all other weighted criteria.</li> <li>• Program critical set points and maintenance activities.</li> </ul> <p>Following the operating parameter development, complete the following analysis:</p> <ul style="list-style-type: none"> <li>• Present status and PCI report in Excel format c/w PCI charts and backlog.</li> <li>• Fix all needs analysis and budget.</li> <li>• Steady state (SS), do nothing, unlimited, SS plus 50%, SS minus 50%.</li> <li>• Budget driven analysis (\$/yr estimate).</li> <li>• Integrate City capital plans and "must do's" (\$ to hit</li> </ul> | <p>Draft analysis and report. Up to 5 models/budget analysis options will be completed.</p> <p>Delivery of draft pavement management report.</p> <p>Deliver 2 hard copies of the final report and an electronic copy on a flash drive.</p> <p>Shape and KML files.</p> |
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set PCI and backlog target).

- After reviewing the analysis and finalizing the results, begin assembling a comprehensive report.
- The report shall include a summary of the network value, pavement condition, rehabilitation & maintenance treatments, budget scenarios, a review of PCI definitions, the operating parameters utilized, and the results of the survey.
- The written report shall be supplemented with appendix's that contain spreadsheet reports such as:

Street Inventory and Condition Summary  
 \$ Driven Rehab Program by Segment  
 \$ Driven Rehab Program by Year  
 Alternate \$ Driven Rehab Programs by Year & Segment.

- Deliver draft report to City and incorporate any modifications to the analysis or reporting methodology.
  - Present report to City staff in a working meeting format.
  - Deliver 2 final reports plus electronic files.
9. Project Management
- Provide client with periodic e-mail updates and reports. Status reports and invoices
  - Meetings to be completed on-site and by conference calls.
  - Complete project administration and invoicing.

**Optional Service Items & Activities:**

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| 10. | Dynalect Mobilization and Calibration                    | <ul style="list-style-type: none"> <li>• Mobilize a Dynalect for subsurface testing.</li> <li>• Calibrate equipment prior to beginning data collection.</li> </ul>   | Equipment calibration results                            |
| 11. | Deflection Testing (2 pass test on arterials/collectors) | <ul style="list-style-type: none"> <li>• On all arterials and collectors collect multi-sensor deflection data at an average of 10 tests per mile using a Dynalect.</li> <li>• Collect GPS and temperature.</li> <li>• Deflection testing requires a city supplied shadow vehicle for traffic control purposes as testing is a stop and go process that will impede traffic.</li> </ul> | Arterial and collector survey of approximately 72 miles. |
| 12. | GPR Testing & Analysis – 170 Survey Miles                | <ul style="list-style-type: none"> <li>• On all arterials and collectors, complete 2 pass Ground Penetrating Radar surveys. Local roadways will receive a single pass.</li> <li>• Develop layer thickness information on a sectional basis.</li> </ul>   | Layer thickness data.                                    |
| 13. | GPR Testing & Analysis –                                 | <ul style="list-style-type: none"> <li>• On all arterials and collectors, complete 2 pass</li> </ul>   | Layer thickness data.                                    |

	72 Survey Miles	Ground Penetrating Radar surveys.	
		<ul style="list-style-type: none"> <li>Develop layer thickness information on a sectional basis.</li> </ul>	
14.	GPR Testing & Analysis – 15 Survey Miles	<ul style="list-style-type: none"> <li>On 15 survey miles of roadway selected by the City, complete 2 pass Ground Penetrating Radar surveys.</li> <li>Develop layer thickness information on a sectional basis.</li> </ul>	Layer thickness data.
15.	Annual Report Updates	<ul style="list-style-type: none"> <li>On an annual basis the PCI and budget reports will be updated and delivered in spreadsheet formats.</li> <li>City to supply IMS with the work completed since the last pavement analysis.</li> </ul>	PCI/Budget reports in Excel Spreadsheets.
16.	City Council Presentation	<ul style="list-style-type: none"> <li>Present report to City in a working meeting format.</li> <li>Create a PowerPoint presentation to showcase the results of the condition survey.</li> </ul>	Report meeting and PowerPoint presentation.
17.	Browser Based Viewing Software	<ul style="list-style-type: none"> <li>Development of a browser based image and data viewing tool to be hosted on City computers.</li> <li>The application will be populated with pavement, right of way asset, and digital image data.</li> <li>City must have a web server and an ArcGIS server. If the City does not wish to retain these, IMS can offer a hosting option instead.</li> </ul>	Delivery and installation of the image and data viewing tool.
18.	Supply of digital Images at 25-Foot Intervals (Per View)	<ul style="list-style-type: none"> <li>Process 1 forward view of pavement imagery at 25-foot intervals.</li> <li>Deliver the images in .jpeg format with an associated geodatabase.</li> <li>Additional views can be added</li> </ul>	GPS coordinate data and digital images on City roadway network.
19.	Asset Data Collection (GPS & Camera Configuration)	<ul style="list-style-type: none"> <li>Mount and configure up to 5 camera views on the RST for right of way asset extraction purposes. The number of cameras required is dependent on the asset to be collected.</li> <li>Arterial and collector roadways will be driven in 2 directions while local roadways will receive a single pass.</li> <li>Develop Master Asset List (MAL) that defines the attributes to be collected for each asset.</li> </ul>	Field Survey Maps
19a.	Sidewalk Inventory, Condition, & Database Development	<ul style="list-style-type: none"> <li>Develop a sidewalk inventory following the attributes defined in the Master Asset List (MAL).</li> <li>All assets are positionally placed in GIS through the utilization of RST imagery, aerial photography, and internal GIS tool-kits.</li> </ul>	Personal geodatabase with asset inventory.
19b.	Curb/Gutter Inventory, Condition, & Database Development	<ul style="list-style-type: none"> <li>Develop a curb/gutter inventory following the attributes defined in the Master Asset List (MAL).</li> <li>All assets are positionally placed in GIS through the</li> </ul>	Personal geodatabase with asset inventory.

		utilization of RST imagery, aerial photography, and internal GIS tool-kits.	
19c.	Sign/Support Inventory, Condition, & Database Development	<ul style="list-style-type: none"> <li>• Develop a sign/support inventory following the attributes defined in the Master Asset List (MAL).</li> <li>• All assets are positionally placed in GIS through the utilization of RST imagery, aerial photography, and internal GIS tool-kits.</li> </ul>	Personal geodatabase with asset inventory.
19d.	ADA Ramp Compliance and Condition Database Development	<ul style="list-style-type: none"> <li>• Develop an ADA Ramp inventory following the attributes defined in the Master Asset List (MAL).</li> <li>• Inventory and classify ramps into 4 category types. Type I - compliant. Type II - present but not compliant on either geometry or visual impairment facilities. Type III - present but not compliant of geometry and visual impairment facilities. Type IV - missing ADA ramps.</li> <li>• All assets are positionally placed in GIS through the utilization of RST imagery, aerial photography, and internal GIS tool-kits.</li> </ul>	Personal geodatabase with asset inventory.

