Exhibit C

PAVEMENT SERVICES, INC.

INNOVATIVE PAVEMENT SOLUTIONS

3835 NE TILLAMOOK STREET
PORTLAND, OREGON 97212
503.235.0377
www.psipdx.com

February 25, 2014

City of Ashland Public Works Department
Attn: Mr. Steve Burkhalter
20 East Main
Ashland, OR 97520

Subject: **Scope of Work and Fee Estimate for Engineering Services (Revision 1)**
Deflection Testing and Analysis
City of Ashland Street System

Dear Steve:

It was a pleasure to meet with you at your office on February 4, 2014 to discuss your interest in deflection testing and engineering analysis services for the Ashland street system. I was interested to learn about your role as the Pavement Manager within the Public Works Department and how you are dealing with the challenge of establishing maintenance and rehabilitation priorities within the Ashland street system based on structural condition.

We are pleased to submit the enclosed scope of work and fee estimate to conduct nondestructive deflection testing (NDT), pavement coring and analysis of selected streets within your street network. Based on discussions with you, we believe that our approach, which focuses on our expertise in assessing pavement structural and functional conditions, our knowledge and understanding of the pavement preservation philosophy, and our comfort level with NDT, rehabilitation analysis, pavement management, Geographic Information Systems (GIS) and other tools, is in concert with the goals and objectives of the City of Ashland.

We are thankful for the opportunity to submit this proposal and very much look forward to the opportunity to work with the City of Ashland. Please feel free to call me at (503) 235-0377 with any questions that you may have.

Sincerely,

PAVEMENT SERVICES, INC.

John I. Duval, P.E., G.E.
President

Enclosures

PAVEMENT SERVICES, INC.

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PROPOSED SCOPE OF WORK (REVISION 1)
DEFLECTION TESTING and ANALYSIS
CITY OF ASHLAND STREET SYSTEM

Submitted to
City of Ashland Public Works Department
February 25, 2014

This proposed scope of work and fee estimate is prepared in response to a request from the City of Ashland Public Works Department. The proposed work consists of nondestructive deflection testing (NDT) and engineering analysis/design services for numerous street segments within the city street system.

FIRM CAPABILITIES

Pavement Services, Inc. (PSI) is a Portland based veteran-owned Emerging Small Business (ESB #5643) specializing exclusively in engineering, testing and investigation services related to pavements. The firm was founded in 1985 and has completed approximately 1,500 projects for roadway, airport and industrial yard pavements. This experience includes numerous projects for the cities of Portland, Salem, Eugene, Klamath Falls, Bend, the Oregon Department of Transportation, Port of Portland, Washington County, Clackamas County, the US Forest Service and many other agencies in the Pacific Northwest.

Scope of Expertise and Consulting Services

Our project experience in the past 29 years includes 2,500 miles of roadway pavement and 3,500 acres of airport and industrial yard pavements encompassing the types of projects and services outlined below:

- **Pavement Categories**
  - *Roadways from local through principal arterial classification*
  - *Airfields, container yards, log handling yards and intermodal shipping yards*
  - *Industrial roadways, truck terminals and marine terminals*
  - *Off-road and industrial facilities with heavy wheel loads and/or unique traffic characteristics*
  - *Parking lots, bike paths, tennis courts and other light duty pavements*
- **Pavement Types**
  - *Asphalt concrete and portland cement concrete*
  - *Porous pavements*
  - *Interlocking unit pavers*
  - *Perpetual and long life pavements*
  - *Aggregate surfaced roadways*

- **Pavement Rehabilitation and New Pavement Design**
  - *Flexible, rigid and aggregate surfaced pavement design*
  - *Overlay and inlay design*
  - *Full Depth Reclamation & in-place stabilization with portland cement, lime and flyash additives*
- **Pavement Evaluation and Related Testing**
  - *Evaluation of pavement capacity, remaining life and structural and surface condition*
  - *Life cycle cost analysis*
  - *Pavement distress survey*
  - *Pavement failure analysis*
- **Pavement Management Systems**
  - *Implementation of pavement management systems*
  - *Visual pavement ratings*
  - *Network funding analysis*
  - *Condition predication modeling*
  - *Audit of pavement management systems and practices*
- **Pavement Construction Management and Construction Troubleshooting**
  - *QA/QC planning and management*
  - *Mix design review*
  - *Soft subgrade remediation*
- **Testing Capabilities**
  - *FWD testing and backcalculation analysis*
  - *Pavement core exploration, shallow borings and test pit explorations*
  - *PCC load transfer and void detection analysis*
  - *Triaxial and indirect tensile resilient modulus (M_r) testing*
  - *Routine soil classification, compaction, plasticity and strength tests*

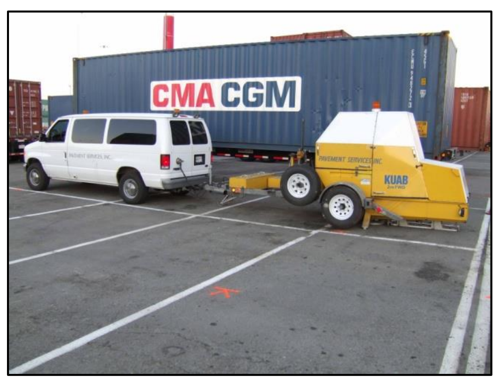
Staff Experience and Qualifications

Our Principal Engineer, John I. Duval, P.E., G.E. is a registered civil and geotechnical engineer (#19063PE) in the State of Oregon and has 26 years of civil, geotechnical, and pavement engineering experience. John's experience includes design, evaluation, and forensic engineering for highways, airports, and local agencies in the Pacific Northwest and around the world.

Senior Engineer Mike Maloney, P.E. is a registered professional civil engineer with 25 years of experience in geotechnical and pavement engineering (23 years of experience with Pavement Services). He has designed and/or analyzed all types of pavement including asphalt concrete (AC), portland cement concrete (PCC), composite pavement, roller compacted concrete, interlocking concrete paver blocks, gravel surfaced roads and pavement incorporating stabilized base, modified subgrade and geotextiles/geogrids.

Supporting Resources

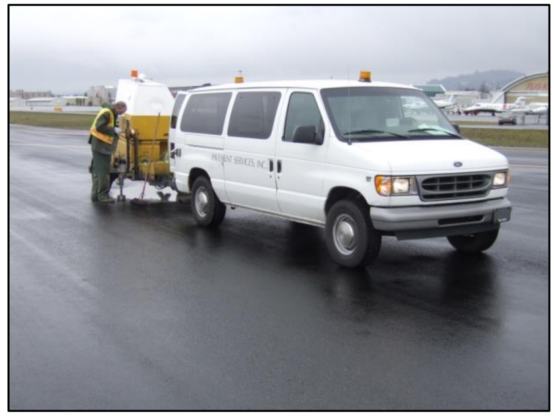
Falling Weight Deflectometer



Our KUAB 2m Model 150 Falling Weight Deflectometer (FWD) fully complies with ASTM D 4694, FAA AC 150/5370-11A and is annually "reference calibrated" at one of the FWD Calibration Centers. This device is a highway to airfield weight FWD capable of generating impulse loads in the range of 7,000 to 32,000 lbs. The load impulse is generated by a two mass/two buffer falling weight system and is applied to the pavement surface through a 4-part segmented plate designed to apply uniform surface pressure distribution despite irregularities in the pavement surface. Pavement deflections are measured by 8 seismometers (absolute deflection sensors) with a measurement range of up to 200 mils. The FWD is equipped with video cameras for positioning of the load plate near PCC joints and a submeter Trimble™ GPS receiver with on-board GPS display for navigation and real-time display of recorded test locations.

Pavement Coring Equipment

We are equipped with an eight-inch diameter capacity electric core drill that can be mounted on our FWD or used independently. Our other coring related equipment includes a 6 KW portable generator, electric powered 20 lb demolition/compaction hammer and a wet-dry vacuum.



Dynamic Cone Penetrometer

We have a single mass dynamic cone penetrometer (DCP) device that complies with ASTM 6951 that we have used since 1991 for in situ measurement of CBR strength.

Analysis Software

Our experience with pavement analysis software includes FAARFIELD, BAKFAA, EVERCALC, Forwardcalculation, PerRoad, KENPAVE, DAMA and ELSYM5. We have also developed software for FWD backcalculation analysis (PAVBACK) and highway overlay/inlay analysis (PAVCALC).

PROJECT UNDERSTANDING

The street segments are divided into two categories consisting of a small set of street segments requiring “Project Level” testing/analysis and a large set of street segments requiring “Network Level” testing/analysis. The primary difference between the two is the scope of testing and analysis required.

Based on discussions with the City staff, we will describe our proposed services in terms of two tasks. Task 1 is to conduct a Project Level analysis of three streets that have been identified by the City as candidates for rehabilitation. Hence, the pavement testing and engineering analysis for these streets will be accomplished to develop specific design recommendations. Task 2 will be to conduct a Network Level analysis of a larger group of streets for which the objective of testing and evaluation is to provide the City an overall estimate of the structural and functional condition. The ultimate purpose of the Task 2 Network Level study will be to supply the City data that can be used to prioritize street segments for maintenance and rehabilitation (M&R) work and/or estimate the overall M&R budget requirements. Ideally the Network Level structural condition information will be used in conjunction with visual survey data within the framework of a pavement management system (PMS).

The “Project Level” streets are shown in Table 1 and are identified as principal urban arterials within the city (based on the ODOT Transportation map for Ashland). Network Level streets are listed in Table 2. Our proposed work scope and fee estimate are shown below for the Project Level and Network Level testing and analysis.

TASK 1—PROJECT LEVEL ANALYSIS—ASHLAND STREET AND SISKIYOU BOULEVARD

As shown in Table 1, Task 1 consists of the analysis of three principal arterial street segments with a combined centerline length of approximately 10,275 feet located south of the city center.

Table 1—Task 1 Street Segments

Street	From	To	Number of Lanes	Approx. Centerline Length, ft
Ashland St	Siskiyou Blvd	Faith St	4	3,425
Siskiyou Blvd	Walker Ave	Ashland St	2	1,150
Siskiyou Blvd	Ashland St	E Main St	4	5,700

Task Description

Ashland St. – Siskiyou Blvd. to Faith St.

Ashland Street is an approximately 70-ft wide, 4-lane street with a center turn lane and bike paths on each side of the street. The center turn lane has intermittent landscaped islands.

Based on a review of Google Earth imagery, the pavement exhibits nearly continuous low severity alligator cracking, an extensive amount of block cracking and transverse cracks, which are likely due to either low temperature age-related cracking or reflective cracks from underlying cracks in a stabilized base such as cement treated base (CTB).

Based on the soil survey of Jackson County, the near surface soils within the project area consist of the Central Point Sandy Loam (20%), the Kubli Loam (51%) and the Medford Silty Clay (29%). In typical profile, the Central Point soil is a non-plastic sandy SILT, the Kubli series is a low plasticity SILT and the Medford soil is a moderate to high plasticity silty CLAY. Hence, there is a significant variation in the type of subgrade soil found between the project limits and likely a corresponding variation in the subgrade support characteristics. Depending upon the in situ moisture content, the Central Point series likely provides the weakest subgrade resilient modulus of the three soil types.

We accessed the Oregon Transportation Management System (OTMS) database to estimate the traffic loading on the east end of the project since Ashland St. becomes an ODOT highway at the railroad bridge near the east end of the project. The data indicates that the 20-year loading on Ashland St. is approximately 960,000 Equivalent Single Axle Loads (ESALs) which corresponds to a traffic index (TI) of 8.96. This may be higher than the actual loading, since OTMS uses automatic traffic recording classification data obtained outside urban areas and applies it to average daily traffic (ADT) data within urban areas. Since auto traffic typically increases more than truck traffic as you approach urban areas, the result is that the estimates are typically on the high side. Nevertheless, the data do show that the loading on Ashland St. is relatively high.

Our preliminary assessment indicates that the street may be rehabilitated with inlay or a combination of inlay and overlay. It may be feasible to raise the grade, if necessary, to meet the structural requirements, since it appears that a slight grade increase on the order of 1-inch could be transitioned down over the bike lane. Our rehabilitation recommendations will be based on not only the structural requirements but also on the need to control reflective cracking given the extent of existing cracking distress.

Siskiyou Blvd. - Walker St. to Ashland St.

This section of Siskiyou Blvd. consists of one through lane in each direction, a center turn lane and bike paths on each side of the street. The street has been widened in some places on the west side to accommodate parking and the street width varies from approximately 48-ft to 56-ft wide, depending upon whether parking is available. Approximately 500 feet north of Walker St., the street widens by about 10-ft and there are two travel lanes in the northbound direction.

Our review of publically available satellite imagery shows that the pavement exhibits nearly continuous low severity alligator cracking, a significant amount of block cracking and transverse cracks, which are likely due to either low temperature cracking or reflective cracks from underlying aged and cracked

CTB. It appears that the southbound lane has been inlayed or skin patched, which was not done elsewhere on the roadway, though it appears to be several years old.

Based on the soil survey of Jackson County, the near surface soils within the project area consist entirely of Medford Silty Clay. As noted above, the Medford Silty Clay is a moderate to highly plastic CLAY but depending upon the in situ moisture content, likely offers relatively good subgrade support characteristics.

From the OTMS database, we can estimate the traffic loading on the south end of the project, since Siskiyou Blvd. becomes Hwy 99 south of Walker St. The data indicates that the 20-year loading on Siskiyou Blvd. is approximately 450,000 ESALs, corresponding to a traffic index of 8.18. As discussed previously this may be higher than the actual loading, which should be determined based on classified tube counts.

An initial assessment indicates that the street may be rehabilitated with inlay or a combination of inlay and overlay. It may be feasible to raise the grade, if necessary to meet the structural requirements, since it appears that a slight grade increase (on the order of 1-inch) could be transitioned down over the bike lane. Our rehabilitation recommendations will be based on not only the structural requirements but also on the need to control reflective cracking given the extent of existing cracking distress.

Siskiyou Blvd. – Ashland St. to E. Main St.

This section of Siskiyou Blvd. consists of two through lanes in each direction with a landscaped center median area (with turn lanes at major intersections), and bike paths on each side of the street. The street has been widened in a few places on the west side to accommodate parking and the street width varies from approximately 68-ft to 76-ft wide, depending upon whether parking is available. At the far north end of the project (near E. Main St.), Siskiyou Blvd. splits into a couplet.

The pavement exhibits some low severity alligator cracking, block cracking and transverse cracks which are likely due to either low temperature cracking or reflective cracks from underlying aged and cracked CTB.

Based on the soil survey of Jackson County, the near surface soils within the project area consist of the Kubli Loam (22%) and the Shefflein Loam (78%). As noted above, the Kubli Loam is a low plastic SILT. In typical profile, the Shefflein Loam consists of a 10-inch thick layer of low to non-plastic SILT over a moderately plastic clayey SILT over weathered bedrock (at 56-inch depth). Although the thin 10-inch layer of non-plastic SILT probably offers the lowest subgrade support, compared to the other soil types, it likely was removed during grading of the original roadway. Since the weathered bedrock is relatively shallow it will influence the surface deflection testing results and should be accounted for in the analysis.

The OTMS database shows the traffic loading on the north end of the project north of E. Main St. The data indicate that the 20-year loading on Siskiyou Blvd. is approximately 525,000 ESALs, corresponding to a traffic index of 8.34. As discussed previously this may be higher than the actual loading, which should be determined based on classified tube counts.

Similar to the previous sections, our early assessment is that the street may be rehabilitated with inlay or a combination of inlay and overlay. It may be feasible to raise the grade, if necessary to meet the structural requirements, since it appears that a slight grade increase (on the order of 1-inch) could be transitioned down over the bike lane. Our rehabilitation recommendations will be based on not only the structural requirements but also on the need to control reflective cracking given the extent of existing cracking distress.

Our proposed work scope for the project level analysis is summarized below.

Task 1—Scope of Services

1. FWD testing will be conducted between the project limits shown in Table 1 at 200-foot intervals in the outer wheelpath of each of the travel lanes. The FWD impact sequence at each test location will consist of an unrecorded seating impact load followed by two measurement impact loads, all at nominally 9,000 lbs force. Deflections will be measured at 0, 8, 12, 18, 24, 36, 48 and 60 inches from the center of the 12-inch diameter load plate. Air temperature will be measured and pavement surface temperature will be measured by infrared sensor at the test locations. The stations of the test points, with respect to the designated starting station, will be measured by an on-board distance measuring instrument and the test points will be paint marked on the pavement to facilitate locating core explorations at selected FWD test points. The data from the two measured impact loads will be averaged to reduce the effect of random error and normalized to a consistent 9,000 lb (9-kip) load basis.

2. The FWD deflection data will be analyzed using our PAVBACK software to calculate the effective structural number of the existing pavement structure (SN_{eff}) and the resilient modulus (M_r) of the subgrade soil at each FWD test location. The SN_{eff} values will be analyzed to delineate groups of test points (analysis units) having statistically similar values and to select locations in each analysis unit for pavement coring at FWD test points with backcalculated SN_{eff} values that closely match the average SN_{eff} value of the analysis unit.

3. The pavement will be visually inspected to identify areas of distress indicative of structural or subgrade failure.

4. Pavement core explorations will be conducted at the selected FWD test locations and/or may be conducted on cracks to investigate the cause and depth of the cracks in cases where it appears that the cracks may originate downward from the surface (“top down” cracks). The core explorations are divided into full depth cores where the depth of the aggregate base/subbase is measured and sampling of the subgrade is done and surface cores where just the thickness of the “bound layer(s) is measured. The actual number of pavement core explorations that may be required to adequately characterize pavement conditions cannot be determined prior to preliminary structural analysis of the FWD test data. However, based on experience with similar projects, we have assumed up to 10 full depth cores and 5 surface cores for our work scope. This estimate is based on coring at an average interval of 1,000-ft and 2,000-ft per centerline length for the full depth and surface cores, respectively.

   The core exploration holes will be drilled through the bound layers of the pavement surface by diamond bit core drill and for the full depth cores extended, where feasible, to a depth of 3 to 5 ft below the pavement surface by a solid stem power auger operated by a subcontractor. Asphalt concrete core samples will be inspected for cracking, delamination and indications of asphalt stripping damage. For the full depth cores, the pavement layers and subgrade soil will be visually classified, the depth and thickness of pavement layers will be measured and jar samples of subgrade soil, where encountered, will be retrieved for laboratory water content determination and visual reclassification.

   For the full depth cores, we will mark the core locations and call for utility locates prior to conducting the explorations. The depth of the exploration below the bound layers will be patched using excavated materials compacted by a vibratory hammer and the core hole through the bound layers will be patched using “Instant Road Repair”, a high performance ODOT approved (QPL #1895) polymer modified asphaltic patching material, compacted by vibratory hammer. Our technician will conduct and direct the pavement coring work.

5. We will provide traffic control for all fieldwork that affects traffic operation. The traffic control will be accomplished by our qualified traffic control subcontractor in accordance with the MUTCD and ODOT requirements for traffic control in short term work zones.
6. Our fee estimate is based on conducting the FWD testing and pavement coring work during Monday through Friday between the hours of 9 AM and 4 PM.
7. All jar samples of subgrade soils retrieved from the coring explorations will be tested in the laboratory to determine water content and the samples will be examined to refine their visual classification
8. The field investigation data and traffic data will be analyzed to develop design recommendations for rehabilitation. Rehabilitation alternatives for a 10, 15 and 20-year design life will be considered in the following order, based on feasibility, for the purpose of developing the most economical rehabilitation treatment: Overlay, then inlay, then partial depth reconstruction and finally full depth pavement reconstruction. The design analysis will be accomplished using the procedures of the 1993 AASHTO *Guide for Design of Pavement Structures* and the December 2011 *ODOT Pavement Design Guide.*
9. The findings and recommendations of the pavement investigation will be presented in a design report. Three copies of the report will be submitted.

Assumptions

Our fee estimate is based on the following assumptions in addition to the scope of work described above:

1. The City will provide the necessary permits for the testing work at no cost and will waive bonding requirements.
2. The City will provide current traffic volume counts with a breakdown of truck traffic categorized by FHWA axle-category or an estimated traffic index (TI) and estimated traffic growth rate. It has been our experience that 72 hour classified tube counts taken in an area where free flowing conditions exist offer the best estimate of the truck traffic loading.

TASK 2— NETWORK LEVEL ANALYSIS OF 134 STREET SEGMENTS

As shown in Table 2, the City has identified 134 street segments for Network Level deflection testing and analysis with a combined centerline length of 119,520 feet. A review of the list indicates there are 48 different streets, though there may be less depending upon how the streets are classified (for example we counted S. Mountain Ave. separately from N. Mountain Ave.). The list of streets includes minor arterials, urban collectors and residential streets.

We understand that the City is interested in conducting a "broad-brushed" analysis of these streets in order to provide an estimate of the structural capacity and remaining structural life of the streets. The estimated pavement remaining life data for the streets would be used by the City to prioritize streets for maintenance and rehabilitation work and would be valuable data to input into a pavement management system.

Our proposed work scope for the network level analysis is summarized below.

Scope of Services

1. FWD testing will be conducted on each street listed in Table 2 (though not necessarily on every segment listed in Table 2). We propose to conduct FWD testing at a frequency of one test per 400-ft of street length where street length refers to the combined street length of the individual segments for each street. However, a minimum of 2 FWD tests will be accomplished on each street regardless of its length. The proposed number of FWD tests for each street is shown on Table 2. The tests will be

City of Ashland
Task 2--Network Level Deflection Testing and Analysis (Revision 1)
Selected City of Ashland Street Segments
2/25/2014

Table 2--Schedule of FWD Tests and Core Explorations

Section	Street	From	To	Length, ft.	Street No.	Total Street Length, ft.	No. of FWD Tests	No. of Cores
Sec 5-86	ASHLAND ST	TAYLOR ST	MORTON ST	1153	1			
Sec 6-82	ASHLAND ST	UNIVERSITY WY	S MOUNTAIN AV	444	1			
Sec 6-62	ASHLAND ST	S MOUNTAIN AV	BEACH ST	692	1			
Sec 6-63	ASHLAND ST	MORTON ST	BEACH AV	680	1			
Sec 5-91	ASHLAND ST	TAYLOR ST	GUTHRIE ST	498	1	3467	9	1
Sec 6-52	BEACH ST	SB SISKIYOU BL	HENRY ST	1010	2			
Sec 6-53	BEACH ST	HENRY ST	ASHLAND ST	767	2			
Sec 6-54	BEACH ST	ASHLAND ST	GLENWOOD DR	1050	2			
Sec 6-55	BEACH ST	GLENWOOD DR	END OF ROAD	496	2	3323	8	1
Sec 3-29	BEAVERSLIDE	LITHIA WY	WATER ST	132	3	132	2	
Sec 9-5	BELLVIEW AV	SISKIYOU BL	CORNER	1292	4			
Sec 9-6	BELLVIEW AV	CORNER	END OF CUL DE SAC	655	4	1947	5	1
Sec 1-58	CHESTNUT ST	WIMER ST	MAPLE ST	1127	5	1127	3	
Sec 3-28	CHURCH ST	N MAIN ST	SCENIC DR	1432	6	1432	4	
Sec 8-54	CRESTVIEW DR	PARK ST	END OF ROAD	1029	7			
Sec 8-42	CRESTVIEW DR	HILLVIEW DR	PARK ST	650	7	1679	4	1
Sec 16-49	E HERSEY ST	ANN ST	OAK ST	1920	8			
Sec 16-53	E HERSEY ST	ANN ST	N MOUNTAIN AV	766	8	2686	7	1
Sec 14-38	E MAIN ST	N MOUNTAIN AV	R/R TRACKS	1180	48			
Sec 14-32	E MAIN ST	R/R TRACKS	WALKER AV	1849	48	3029		1
Sec 16-15	FORDYCE ST	EVAN LN	END OF CUL DE SAC	786	9	786	2	
Sec 18-52	GLENN ST	R/R TRACKS	N MAIN ST	539	10	539	2	
Sec 3-36	GRANITE ST	N MAIN ST	NUTLEY ST	1548	11			
Sec 3-40	GRANITE ST	NUTLEY ST	WINBURN WY	2284	11			
Sec 3-44	GRANITE ST	WINBURN WY	PARKING LOT	1441	11			
Sec 3-45	GRANITE ST	PARKING LOT	END OF PAVEMENT	1373	11	6646	17	2
Sec 9-8	GREEN MEADOWS WY	BELLVIEW AV	APPLE WY	709	12			
Sec 9-9	GREEN MEADOWS WY	APPLE WY	RANCH RD	578	12			
Sec 9-10	GREEN MEADOWS WY	RANCH RD	LUPINE DR	736	12			
Sec 9-11	GREEN MEADOWS WY	LUPINE DR	TOLMAN CREEK RD	1330	12	3353	8	1
Sec 4-49	GRESHAM ST	E MAIN ST	PEARL ST	804	13			
Sec 4-55	GRESHAM ST	PEARL ST	IOWA ST	699	13	1503	4	1
Sec 18-35	HELMAN ST	CORNER	W NEVADA ST	1217	14			
Sec 18-1	HELMAN ST	W HERSEY ST	VAN NESS AV	475	14			
Sec 18-18	HELMAN ST	OHIO ST	CORNER	1446	14			
Sec 18-19	HELMAN ST	W HERSEYST	OHIO ST	345	14			
Sec 18-55	HELMAN ST	VAN NESS AV	LITHIA WY	965	14	4448	11	2
Sec 6-60	HENRY ST	BEACH ST	S MOUNTAIN AV	703	15			
Sec 6-56	HENRY ST	LIBERTY ST	BEACH ST	329	15	1032	3	
Sec 8-23	HILLVIEW DR	SISKIYOU BL	PEACHEY RD	1555	16			
Sec 8-26	HILLVIEW DR	PEACHEY RD	CRESTVIEW DR	1013	16	2568	6	1
Sec 5-43	HOLLY ST	TERRACE ST	IDAHO ST	1318	17			
Sec 5-48	HOLLY ST	IDAHO ST	HARRISON ST	664	17			
Sec 5-50	HOLLY ST	HARRISON ST	MORTON ST	349	17			
Sec 6-37	HOLLY ST	MORTON ST	LIBERTY ST	252	17	2583	6	1
Sec 7-20	INDIANA ST	WOODLAND DR	MADRONE ST	1403	18			
Sec 7-21	INDIANA ST	MADRONE ST	SB SISKIYOU BL	728	18	2131	5	1
Sec 4-94	IOWA ST	GRESHAM ST	TERRACE ST	770	19			
Sec 5-21	IOWA ST	GRESHAM ST	HARRISON ST	1223	19			
Sec 6-35	IOWA ST	HARRISON ST	SISKIYOU BL	896	19	2889	7	1
Sec 6-22	LIBERTY ST	SB SISKIYOU BL	IOWA ST	205	20			
Sec 6-23	LIBERTY ST	IOWA ST	ASHLAND ST	1780	20			

City of Ashland
Task 2--Network Level Deflection Testing and Analysis (Revision 1)
Selected City of Ashland Street Segments
2/25/2014

Table 2--Schedule of FWD Tests and Core Explorations

Section	Street	From	To	Length, ft.	Street No.	Total Street Length, ft.	No. of FWD Tests	No. of Cores
Sec 6-30	LIBERTY ST	ASHLAND ST	END OF ROAD	718	20	2703	7	1
Sec 5-84	MORTON ST	IOWA ST	PENNSYLVANIA AV	805	21			
Sec 5-85	MORTON ST	EUCLID AV	ASHLAND ST	881	21			
Sec 5-94	MORTON ST	ASHLAND ST	FOREST ST	334	21			
Sec 5-95	MORTON ST	FOREST ST	LISA LN	910	21			
Sec 5-96	MORTON ST	LISA LN	WATERLINE RD	883	21			
Sec 5-97	MORTON ST	WATERLINE RD	ASHLAND LOOP RD	773	21			
Sec 5-83	MORTONST	SISKIYOU BL	IOWA ST	390	21	4976	12	2
Sec 18-65	N LAUREL ST	W HERESY ST	VAN NESS AV	477	22			
Sec 18-67	N LAUREL ST	VAN NESS AV	N MAIN ST	557	22			
Sec 18-37	N LAUREL ST	RANDY ST	W NEVADA ST	595	22			
Sec 18-4	N LAUREL ST	W HERSEY ST	ORANGE AV	684	22			
Sec 18-15	N LAUREL ST	ORANGE AV	RANDY ST	1275	22	3588	9	2
Sec 15-75	N FIRST ST	A ST	B ST	441	23			
Sec 15-81	N FIRST ST	B ST	LITHIA WY	429	23			
Sec 4-7	N FIRST ST	LITHIA WY	EMAIN ST	270	23	1140	3	1
Sec 16-13	N MOUNTAIN AV	TOP OF THE HILL	E HERSEY ST	896	24			
Sec 17-8	N MOUNTAIN AV	BRIDGE ST	E NEVADA ST	1658	24			
Sec 17-75	N MOUNTAIN AV	STONY POINT	OVERPASS BRIDGE	563	24			
Sec 14-40	N MOUNTAIN AV	E MAIN ST	R/R TRACKS	878	24			
Sec 16-4	N MOUNTAIN AV	R/RTRACKS	VILLAGE GREEN DR	1100	24			
Sec 17-7	N MOUNTAIN AV	E HERSEY ST	BRIDGE	1249	24	6344	16	2
Sec 4-5	N PIONEER ST	LITHIA WY	E MAIN ST	196	25	196	2	
Sec 4-10	N SECOND ST	LITHIA WY	E MAIN ST	340	26	340	2	
Sec 3-2	NUTLEY ST	WINBURN WY	GRANITE ST	345	27			
Sec 3-10	NUTLEY ST	GRANITE ST	SCENIC DR	682	27	1027	3	
Sec 10-5	OAK KNOLL DR	HIGHWAY 66	TWIN PINES CR	1443	28			
Sec 10-7	OAK KNOLL DR	TWIN PINES CR	TWIN PINES CR	1260	28			
Sec 10-13	OAK KNOLL DR	E PEBBLE BEACH DR	CYPRESS POINT LP	775	28			
Sec 10-41	OAK KNOLL DR	CYPRESS POINT LP	TWIN PINES CR	1211	28	4689	12	2
Sec 15-79	OAK ST	R/R TRACKS	LITHIA WY	1016	29			
Sec 16-47	OAK ST	R/R TRACKS	E HERSEY ST	622	29			
Sec 4-2	OAK ST	LITHIA WY	E MAIN ST	209	29			
Sec 17-28	OAK ST	OAK LAWN AV	E HERSEY ST	1404	29			
Sec 17-31	OAK ST	OAK LAWN AV	W NEVADA ST	1916	29			
Sec 17-33	OAK ST	E NEVADA ST	CITY LIMITS	197	29	5364	13	2
Sec 18-25	ORANGE AV	HELMAN ST	N LAUREL ST	655	30			
Sec 18-26	ORANGE AV	N LAUREL ST	R/R TRACKS	1034	30	1689	4	1
Sec 8-46	PARK ST	NEZLA ST	CRESTVIEW DR	747	31			
Sec 8-45	PARK ST	SISKIYOU BL	NEZLA ST	1431	31	2178	5	1
Sec 18-44	RANDY ST	HELMAN ST	N LAUREL ST	1045	32	1045	3	
Sec 4-40	S FIRST ST	E MAIN ST	HARGADINE ST	342	33	342	2	
Sec 14-39	S MOUNTAIN AV	E MAIN ST	SISKIYOU BL	1690	34			
Sec 6-71	S MOUNTAIN AV	SB SISKIYOU BL	HENRY ST	548	34			
Sec 6-72	S MOUNTAIN AV	HENRY ST	ASHLAND ST	749	34			
Sec 6-73	S MOUNTAIN AV	ASHLAND ST	PLEASANT WY	637	34			
Sec 6-75	S MOUNTAIN AV	PLEASANT WY	PROSPECT ST	673	34			
Sec 6-77	S MOUNTAIN AV	PROSPECT ST	EMMA ST	663	34	4960	12	2
Sec 4-31	S PIONEER ST	E MAIN ST	HARGADINE ST	382	35			
Sec 4-33	S PIONEER ST	HARGADINE ST	END OF ROAD	533	35	915	2	
Sec 4-41	S SECOND ST	E MAIN ST	HARGADINE ST	341	36	341	2	
Sec 1-52	SCENIC DR	WIMER ST	MAPLE ST	1039	37			

City of Ashland
Task 2--Network Level Deflection Testing and Analysis (Revision 1)
Selected City of Ashland Street Segments
2/25/2014

Table 2--Schedule of FWD Tests and Core Explorations

Section	Street	From	To	Length, ft.	Street No.	Total Street Length, ft.	No. of FWD Tests	No. of Cores
Sec 2-28	SCENIC DR	WIMER ST	GRANDVIEW DR	1736	37			
Sec 3-6	SCENIC DR	GRANDVIEW DR	CHURCH ST	1004	37			
Sec 3-8	SCENIC DR	CHURCH ST	NUTLEY ST	657	37	4436	11	2
Sec 11-15	TOLMAN CREEK RD	HIGHWAY 66	R/R TRACKS	998	38			
Sec 11-16	TOLMAN CREEK RD	R/R TRACKS	SISKIYOU BL	2582	38	3580	9	1
Sec 18-58	VAN NESS AV	HELMAN ST	OAK ST	720	39			
Sec 18-59	VAN NESS AV	HELMAN ST	N LAUREL ST	673	39			
Sec 18-63	VAN NESS AV	N LAUREL ST	N MAIN ST	727	39	2120	5	1
Sec 18-42	W HERSEY ST	OAK ST	HELMAN ST	955	40			
Sec 18-47	W HERSEY ST	HELMAN ST	N LAUREL ST	674	40			
Sec 18-48	W HERSEY ST	N LAUREL ST	N MAIN ST	1001	40	2630	7	1
Sec 18-28	W NEVADA ST	MICHELLE AV	VANSANT ST	1406	41			
Sec 18-31	W NEVADA ST	MICHELLE AV	HELMAN ST	1025	41	2431	6	1
Sec 8-2	WALKER AV	WINDSOR ST	PINECREST TR	1509	42			
Sec 8-4	WALKER AV	SISKIYOU BL	WINDSOR ST	823	42			
Sec 12-47	WALKER AV	SISKIYOU BL	HIGHWAY 66	577	42			
Sec 14-29	WALKER AV	HIGHWAY 66	R/R TRACKS	2034	42			
Sec 14-30	WALKER AV	R/R TRACKS	E MAIN ST	1376	42	6319	16	2
Sec 11-12	WASHINGTON ST	HIGHWAY 66	JEFFERSON AV	508	43			
Sec 11-13	WASHINGTON ST	JEFFERSON AV	END OF ROAD	713	43	1221	3	
Sec 1-38	WIMER ST	N MAIN ST	SCENIC DR	860	44			
Sec 1-41	WIMER ST	SCENIC DR	CHESTNUT ST	604	44			
Sec 1-43	WIMER ST	CHESTNUT ST	THORNTON WY	1478	44	2942	7	1
Sec 3-67	WINBURN WY	BRIDGE	E MAIN ST	1057	45			
Sec 3-73	WINBURN WY	NUTLEY ST	BRIDGE	809	45	1866	5	1
Sec 17-49	W NEVADA ST	OAK ST	HELMAN ST	789	46	789	2	
Sec 7-12	WOODLAND DR	INDIANA ST	WALKER AV	528	47			
Sec 7-13	WOODLAND DR	INDIANA ST	PALMER RD	331	47			
Sec 7-14	WOODLAND DR	INDIANA ST	WALKER AV	623	47			
Sec 7-15	WOODLAND DR	PALMER RD	PINECREST TR	567	47	2049	5	1
			Total	119520			298	43

conducted in the outer wheelpath of the travel lane at random representative locations based on the frequency discussed above.

The FWD impact sequence at each test location will consist of an unrecorded seating impact load followed by two measurement impact loads, all at nominally 9,000 lbs force. Deflections will be measured at 0, 8, 12, 18, 24, 36, 48 and 60 inches from the center of the 12-inch diameter load plate. Air temperature will be measured and pavement surface temperature will be measured by infrared sensor at the test locations. The stations of the test points, with respect to the designated starting station, will be measured by an on-board distance measuring instrument and the test points will be paint marked on the pavement to facilitate locating core explorations at selected FWD test points. The data from the two measured impact loads will be averaged to reduce the effect of random error and normalized to a consistent 9,000 lb (9-kip) load basis.

2. Pavement surface core explorations will be conducted at a total of 43 locations. This number is based on a frequency of one core for each street where the combined length is greater than 1,500-ft. In addition, for segments greater than 4,000 ft. we plan to conduct a second core exploration. The proposed number of cores for each street are shown in Table 2. At each core location we will measure the thickness of the bound layer. The core exploration holes will be drilled using our diamond bit core drill and the core holes will be patched using "Instant Road Repair", a high performance ODOT approved (QPL #1895) polymer modified asphaltic patching material, compacted by vibratory hammer. Our technician will conduct and direct the pavement coring work.
3. We will conduct a "windshield survey" of each street to estimate the pavement condition so we can assign a pavement condition factor (used in the AASHTO remaining life analysis) to each street segment.
4. We will provide traffic control for all fieldwork that affects traffic operation. The traffic control will be accomplished by our qualified traffic control subcontractor in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and the 2011 Oregon Temporary Traffic Control Handbook (OTTCH). We have assumed that for residential streets we can follow Diagram 350 in the OTTCH, which is a self-regulating lane closure.
5. Our fee estimate is based on conducting the FWD testing and pavement coring work during Monday through Friday between the hours of 9 AM and 4 PM.
6. The deflection results, core data and windshield survey data will be analyzed to estimate the structural capacity and the remaining life, in terms of ESALs, for each street shown in Table 2. Where we do not have core information for a street, we will use the thickness from streets where we do have core information that have similar functional classification. If the City has traffic loading estimates for the streets (such as an estimate of the TI), the remaining life in terms of ESALs can be converted into years of remaining life. We will provide a table showing the remaining life of each street for the City's use in prioritizing M&R projects.
7. The test data and results will be presented in a technical memorandum.

ESTIMATED FEES AND EXPENSES

We propose to conduct the work described herein on a time and materials basis according to our Standard Rates for Engineering Services and Testing Equipment, included as Attachment A to this proposal. We have developed detailed cost estimates showing the time for each engineering category, hourly rates for these labor categories, and an estimate of direct expenses that may apply to the project, which are included as Attachments B and C for Tasks 1 and 2, respectively.

Table 3—Summary of Estimated Fees and Expenses

Task	Description	Labor	Expenses	Total
1	Project Level Testing and Analysis	$ 16,775	$ 6,356	$ 23,131
2	Network Level Testing and Analysis	$ 22,293	$ 13,205	$ 35,498

As shown on Attachment B, we estimate that our total fee for **Task 1—Project Level Deflection Testing and Analysis** will be $23,156. This includes $16,775 for engineering labor and $6,381 for direct expenses, such as travel, meals, lodging, car rental, equipment charges, core barrel wear, patch material costs and subcontracted labor to supplement our in-house field engineers and technicians. We recommend that a not-to-exceed limit of this contract be established at $23,500. We will not exceed this limit without prior written authorization from the City of Ashland.

Our estimated total fees and expenses for **Task 2—Network Level Deflection Testing and Analysis** are $35,498 as shown in Attachment C. This includes $22,293 for engineering labor and $13,205 for direct expenses, such as travel, meals, lodging, car rental, equipment charges, core barrel wear, patch material costs and subcontracted labor to supplement our in-house field engineers and technicians. We recommend that a not-to-exceed limit of this contract be established at $36,000. We will not exceed this limit without prior written authorization from the City of Ashland.

Please note that our actual labor fee will be the number of hours expended on the project multiplied by the hourly rate for that labor category. Actual direct expenses will be billed to the City at cost, except for subcontracted services which will be billed to the City at cost plus a 10 percent handling fee.

SCHEDULE

Based on our current work schedule, we can begin work on these projects as soon as we receive the required approved permits and we estimate that the work will take approximately 10 weeks to complete both tasks.

CLOSURE

We trust that this proposal provides a sound plan for the City of Ashland to move forward with plans to implement deflection testing and analysis of the city street system. We would be thrilled to work with you on this project and look forward to your positive response to this proposal. Please contact John Duval, P.E. at (503) 235-0377 or john@psipdx.com for any questions about the content of this document.

♦ ♦ ♦

PAVEMENT SERVICES, INC.

INNOVATIVE PAVEMENT SOLUTIONS

3835 NE TILLAMOOK STREET
PORTLAND, OREGON 97212
503.235.0377
www.psipdx.com

Standard Rates for Engineering Services and Testing Equipment

Effective January 1, 2014

Engineering Hourly Fees	
Principal Engineer	$175.85
Senior Engineer/Project Manager	$142.10
Project Engineer II/Project Manager	$129.30
Project Engineer I	$109.20
Staff Engineer	$98.80
Senior Field Technician/FWD Operator	$86.25
Drafting/Field Technician/FWD Operator	$76.90
Administrative Assistant	$69.85
Testing Equipment Fees	
Falling Weight Deflectometer - ASTM D 4694	
Hourly rate for equipment in field	$275.00
Mobilization, per mile each way	$1.25
Field Van (coring & boring exploration work)	
Mobilization, per mile each way	$0.85
Pavement Coring - ASTM D 5361	
Electric core drill, per core hole	$9.25
4-inch diameter core bit & patching materials, per inch of sawn depth	$1.65
6-inch diameter core bit & patching materials, per inch of sawn depth	$2.90
8-inch diameter core bit & patching materials, per inch of sawn depth	$4.15
Portable Dynamic Cone Penetrometer (PDCP) – ASTM D 6951	
Daily Rate for Equipment in the field	$100.00

ATTACHMENT A

City of Ashland Public Works Department
Task 1--Project Level Deflection Testing and Analysis
Ashland Street and Siskiyou Boulevard
2/25/2014

PAVEMENT SERVICES, INC .
3835 N.E. Tillamook Street
Portland, Oregon 97212
503-235-0377

Total Centerline Length 10,275 ft

Labor Estimate				
Classification	Hourly Rate		Estimated Hours	Labor Fee
Principal Engineer	$175.85		8.0	$1,407
Senior Engineer	$142.10		80.0	$11,368
Staff Engineer	$98.80		0.0	$0
FWD/Senior Technician	$86.25		36.0	$3,105
Drafting	$76.90		8.0	$615
Clerical	$69.85		4.0	$279
Labor Subtotal			136.0	$16,775
Expense Itemization				
Item	Basis	Unit Rate	Quantity	Total
Travel--Airfare	ea.	$300.00	1	$300
Travel--Rental Car	day	$100.00	1	$100
FWD Testing	hr.	$275.00	7	$1,925
FWD Mobilization	mile	$1.25	580	$725
FWD Per Diem	day	$125.00	1	$125
Coring Equipment	ea.	$9.25	15	$139
6-inch dia. bit & patch	inch depth	$2.90	120	$348
Power Auger (Subcontractor)	cost +10%	$1,309.00	1	$1,309
Flaggers (Subcontractor)	cost +10%	$1,384.35	1	$1,384
Expense Subtotal				$6,356
Total Estimated Fees				$23,131

ATTACHMENT B

City of Ashland
Task 2--Network Level Deflection Testing and Analysis (Revision 1)
City of Ashland Streets
2/25/2014

PAVEMENT SERVICES, INC .
3835 N.E. Tillamook Street
Portland, Oregon 97212
503-235-0377

Total Centerline Length 119,520 ft

Labor Estimate				
Classification	Hourly Rate		Estimated Hours	Labor Fee
Principal Engineer	$175.85		12.0	$2,110
Senior Engineer	$142.10		50.0	$7,105
Staff Engineer	$98.80		48.0	$4,742
FWD/Senior Technician	$86.25		72.0	$6,210
Drafting	$76.90		24.0	$1,846
Clerical	$69.85		4.0	$279
Labor Subtotal			210.0	$22,293
Expense Itemization				
Item	Basis	Unit Rate	Quantity	Total
Travel--Airfare	ea.	$300.00	1	$300
Travel--Rental Car	day	$100.00	1	$100
Travel--Per Diem	day	$125.00	8	$1,000
FWD Testing	hr.	$275.00	22	$6,050
FWD Mobilization	mile	$1.25	1160	$1,450
Coring Equipment	ea.	$9.25	43	$398
6-inch dia. bit & patch	inch depth	$2.90	344	$998
Flaggers (Subcontractor)	cost +10%	$2,908.95	1	$2,909
Expense Subtotal				$13,205
Total Estimated Fees				$35,498

ATTACHMENT C

JOHN I. DUVAL, P.E., G.E.
President / Principal Engineer

PAVEMENT SERVICES, INC.

Education

M.S., Civil Engineering, University of Washington, 1994
M.S., Systems Management, University of Southern California, 1993
B.S., Civil Engineering, Oregon State University, 1987

Professional Registration

Professional Civil and Geotechnical Engineer – OR #19063
Professional Civil Engineer – FL #49933, HI #9718, ID #14289, UT #8100359-2202, WA #35033
LEED® Accredited Professional

Professional Affiliations

American Society of Civil Engineers - Member
Association of Asphalt Paving Technologists – Member
Society of American Military Engineers

Summary of Professional Experience

- John Duval is a registered professional civil engineer with 25 years of experience providing civil, geotechnical, and pavement engineering services to the transportation sector. His particular expertise is in the design and construction of airport pavements. He has extensive experience in pavement evaluation/design, pavement management, nondestructive testing, construction materials, and the selection and use of innovative materials and methods for pavement construction
- John began his career as a US Air Force civil engineering officer and served for twenty years in the active and reserve forces in the US and overseas. For thirteen years, he served as Chief, Airfield Pavement Evaluation Team for the US Air Force Civil Engineer Center, directing pavement testing, analysis, and design at 40+ airfields around the globe.
- From 2000 to 2007, he served as the Asphalt Institute (AI) Pacific Northwest Regional Engineer.
- John has been appointed **Program Manager** for the semi-annual **Federal Aviation Administration/Asphalt Institute Airport Pavement Workshop Series**.

Selected Examples of Significant Project Experience

- **Rose Street, Walla Walla, Washington.** This project consisted of rehabilitating1.8 miles of four-lane urban arterial street. The existing pavements consisted of composite HMA/PCC sections for the inside lanes and flexible pavement systems for the outside lanes. A variety of rehabilitation strategies were considered including rubblization of the existing concrete panels. Ultimately, we recommended rehabilitation with a PCC overlay on the existing milled HMA, aka whitetopping.
- **OR 42: Grant Smith Rd to I-5 Ramp Extension.** Pavement designs for rehabilitation and widening of this complex interchange were developed using 1993 AASHTO *Guide for Design of Pavement Structures* (AASHTO Guide). Rehabilitation designs for the existing HMA pavements were developed using the procedures from Part III of the AASHTO Guide. Subgrade moduli for the new pavement and rehabilitation designs were estimated from backcalculation analysis of Falling Weight Deflectometer (FWD) tests and Dynamic Cone Penetrometer (DCP) tests.
- **Forensic Investigation, Runway 16R-34L, Snohomish County Airport (Paine Field), Everett, Washington.** A recently paved commercial airport runway began to generate foreign object debris (FOD), which damaged aircraft engines. John analyzed the HMA quality assurance test results, conducted a pavement condition index survey, and developed a laboratory-testing plan. Based on John's assessment, the HMA mixture was deemed to be substandard and was subsequently removed and replaced by the contractor.

MIKE MALONEY, P.E.
Senior Engineer/Project Manager

Education

M.S., Civil Engineering, 1989, Oregon State University
B.S., Civil Engineering, 1983, Oregon State University
B.S., Forest Engineering, 1983, Oregon State University

Professional Registration

Registered Professional Engineer (Civil) – OR #15335, WA #35829, CA #46728

Professional Affiliations

American Society of Civil Engineers (ASCE)

Summary of Professional Experience

- Mike Maloney is a registered professional civil engineer with 25 years of experience in geotechnical and pavement engineering. He has completed evaluation studies and rehabilitation recommendations for 800 miles of roadway and 650 acres of airfield and industrial yard pavement.
- Mike's area of expertise is pavement rehabilitation and design of all types of pavement including asphalt concrete (AC), portland cement concrete (PCC), composite pavement, roller compacted concrete, interlocking concrete paver blocks, gravel surfaced roads and pavement incorporating stabilized base, modified subgrade and geotextiles/geogrids. Mike is experienced with a variety of backcalculation software programs including BAKFAA, Evercalc, Modulus, Weslea and PAVBAK. He iss proficient in the current state of the practice regarding all aspects of pavement evaluation, analysis and design including the AASHTO design method, mechanistic design (Kenlayer/ELSYM5), airport design (LEDFAA, FAARFIELD) and design of perpetual pavements.

Selected Examples of Significant Project Experience

- **Rehabilitation recommendations for the City of Eugene:** 2003 – 2013 Pavement Preservation Programs (114 segments, 57 miles) These segments ranged from local to arterial streets with pavement sections that included AC on aggregate base (AB), AC on cement treated base (CTB), full depth AC, bare PCC and PCC overlaid with AC (composite pavement). Emphasis was placed on finding the most cost effective alternative. As an example, highly plastic clay subgrade was found in two of the segments where reconstruction is required. Recommendations were developed for in-place stabilization with hydrated lime as a potentially economical alternative to overexcavation and aggregate backfill stabilization. "Perpetual" pavement design alternatives were developed for the reconstruction section using the PerRoad software.
- **Rehabilitation recommendations for the City of Salem:** 2009 to 2011 Pavement Rehabilitation (R&R) Projects (22 segments, 13.7 miles) Rehabilitation recommendations were developed for 10, 15 and 20 year design periods using the 1993 AASHTO Guide procedures and our PAVCALC software for analysis of overlay and inlay.
- **Kuebler Blvd Improvements:** I-5 to 1,200 ft west of Stroh Lane, Salem (2007). This 1.4 mile long project included pavement design for widening of the westbound direction by one lane and investigation of premature cracking in PCC pavement of the westbound lane. Investigation of the premature cracking included mapping of cracks, FWD joint load transfer and void detection tests and core explorations. AC pavement was selected for the widening section in order to preserve options for rehabilitation of the adjoining cracked PCC pavement. The widening section was designed for a 40-yr structural life using the 1993 AASHTO Design Guide procedures. Mechanistic analysis of this section using the PerRoad software with Monte Carlo simulation of variability indicated a high probability (92%) of insignificant structural damage during the 40-yr period.