Washington State
Department of Transportation

<table>
<tr><td colspan="2" rowspan="1">SUPPLEMENTAL AGREEMENT</td><td>ORGANIZATION AND ADDRESS
Western Transportation Institute
Montana State University
PO Box 174250
Bozeman, MT 59717-4250</td></tr>
<tr><td colspan="2">AGREEMENT NUMBER
GCA 4281 Supplement 2</td><td>SECTION/LOCATION
Interstate 90 Snoqualmie Pass East</td></tr>
<tr><td>STATE ROUTE NUMBER
90</td><td>CONTROL SECTION NUMBER
1901</td><td rowspan="2">DESCRIPTION OF WORK
The purpose of the project is modified to add “and estimate the quantity and location of wildlife road kills to assist in locating wildlife connectivity structures”.</td></tr>
<tr><td colspan="2">REGION : SOUTH CENTRAL</td></tr>
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This Supplemental Agreement #2 to Agreement GCA 4281 is made and entered into on the 11th day of May, 2006 between the State of Washington, Department of Transportation, acting by and through the Secretary of Transportation, by virtue of Title 47 RCW, hereinafter called the "STATE", and Western Transportation Institute hereinafter called the “WTI“ or “Research Agency”.

WHEREAS, the parties desire to further supplement AGREEMENT GCA 4281 originally executed on January 25, 2005 and amended by Supplement # 1 on January 10, 2006 .

The changes to the agreement are described as follows:

Section III-PERIOD OF PERFORMANCE is revised to extend the agreement completion date from “June 30, 2007, unless terminated sooner, or modified as provided herein” to “December 31, 2007, unless terminated sooner, or modified as provided herein.”

Section V – PAYMENT is revised to increase the maximum payment by the STATE from $37,902.60 to $67,902 as detailed in Exhibit B – 1 Estimate of Cost attached and incorpated by this reference.

Section X - HOLD HARMLESS is replaced by the following:

> WTI shall protect, defend, indemnify, and hold harmless the STATE, its officers, officials, employees, and agents, while acting within the scope of their employment as such, from any and all costs, claims, judgments, and/or awards of damages (both to persons and property), arising out of, or in any way resulting from, WTI’s work to be performed or performed pursuant to the provisions of this AGREEMENT. WTI will not be required to indemnify, defend, or save harmless the STATE if the claim, suit, or action for injuries, death, or damages (both to persons and property) is caused by the sole negligence of the STATE.

Where such claims, suits, or actions result from concurrent negligence of the PARTIES, the indemnity provisions provided herein shall be valid and enforceable only to the extent of the PARTY's own negligence. This indemnification shall survive the termination of this AGREEMENT.

Section XXI – EXHIBITS is amended as follows:

Exhibit "B" Project Costs is supplemented with Exhibit "B-1" attached hereto and by this reference made a part of this AGREEMENT. Exhibit B-1 covers the additional expenses for quantifying and locating road kills.

Exhibit "C" Scope of Work is supplemented with Exhibit "C-1" attached hereto and by this reference made a part of this AGREEMENT. Exhibit C-1 includes additional items of work necessary to document location and quantity of road kills.

All other terms and conditions if the original agreement shall remain in full force and effect except as modified by this Supplement Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this AGREEMENT as of the day and year first above written.

MONTANA STATE UNIVERSITY

By: DALE Huls

Title: DALE HULS, Assistant Director
Office of Sponsored Programs
Montana State University

Date: 5-8-06

STATE OF WASHINGTON
DEPARTMENT OF TRANSPORTATION

By: Todd V. Trepanier for

Title:Regional Administrator, Don Whitehouse

Date: 5/11/06

APPROVED AS TO FORM:

By: [signature]

Assistant Attorney General

Date: 4-13-06

AGREEMENT GCA 04281

Montana State University - Western Transportation Institute

Exhibit "B-1" Estimate of Cost

I-90 Snoqualmie Pass East

Additional expenses to quantify and locate road kill using PDA / GPS technology.

ITEM	Project Year		Hours	Hourly Rate (includes benefits)	Cost
	1	2			
Doug Galarus	160	40	**200**	$53.78	**$10,756**
Sean Graham	460	60	**520**	$25.51	**$13,265**
Justin Krohn	100	20	**120**	$14.32	**$1,718**
Marcel Huijser	160	40	**200**	$34.49	**$6,898**
Amanda Hardy	100	0	**100**	$30.28	**$3,028**
Tony Clevenger	100	0	**100**	$49.45	**$4,945**
Rob Ament	80	20	**100**	$38.89	**$3,889**
Communications Manager	4	16	**20**	$38.81	**$776**
Business Manager	16	4	**20**	$38.81	**$776**
Technical Writer	10	70	**80**	$24.95	**$1,996**
Graphics Technician	20	100	**120**	$21.24	**$2,549**
Labor (hours)	**1210**	**370**	**1580**		
Labor ($)	**$50,597**	**$0**			**$50,597**
Travel	**$6,737**	**$0**			**$6,737**
Washington Field Support					
Flights: 2 WTI staff	**$800**				
Housing and meals	**$576**				
Car rental	**$145**				
Virginia Field Support					
Flights: 2 WTI staff	**$1,600**				
Housing and meals	**$768**				
Car rental	**$145**				
Alberta Field Support					
Flights: 2 WTI staff	**$1,700**				
Housing and meals	**$768**				
Car rental	**$145**				
Montana Field Support					
Travel Mileage	**$90**				
References: programming manuals, etc.	**$500**	**$0**			**$500**
Operations/Communications	**$2,459**	**$0**			**$2,459**
Training Materials and Guides	**$1,000**				
Cellular Data Connectivithy	**$720**				
Miscellaneous	**$739**				

AGREEMENT GCA 04281

Exhibit "B-1" Estimate of Cost (Continued)

ITEM	Project Year 1	Project Year 2	Hours	Hourly Rate (includes benefits)	Cost
Hardware- rugged handheld PDA-GPS Units	$21,000	$0			$21,000
(i.e., Panasonic, Thales, etc.)					
2 units - Washington I-90 Field Site	$4,200				
2 units - Montana I-90 Field Site	$4,200				
2 units - Virginia Field Site	$4,200				
2 units - Alberta Field Site	$4,200				
2 units - WTI Research and Devpt.	$4,200				
Software	$3,400	$0			$3,400
Software Development Environment					
(i.e., MS Visual Studio) 3 licenses	$1,650				
Software Components					
(i.e., GPS, Serial Communcations)	$500				
GIS Software and Data					
(i.e., ARCGIS)	$1,250				
Indirect (41.5%)	$35,148	$0			$35,148
Sum ($)	$119,841	$2			$119,841

Estimated study cost $ **$120,000**

State Participation obligated by Supplement #2 is Not to Exceed one -fourth of $120,000 = $ 30,000.

*Additional expenses shown above are anticipated to be reimbursed by three other Agencies.

Total WSDOT obligation under this AGREEMENT

Original Agreement January 25, 2005	$37,902.60
Supplement # 2 attached here	$30,000.00
Total	$67,902.60

Any reimbursement over $67,902.60 must be approved by written supplement.

AGREEMENT GCA 4281 Supplement #2
EXHIBIT C-1 ADDITIONAL SCOPE OF WORK / STUDY PLAN

Western Transportation Institute at Montana State University
Proposal for
An Integrated PDA/GPS System to Collect Standardized Road-kill Data

Problem
Animal-vehicle collisions are an important issue across North America. The number of ungulate-vehicle crashes is estimated at 725,000-1,500,000 annually in the U.S. These collisions are estimated to cause over 200 human fatalities and over one billion dollars in property damage a year. These numbers are likely to have increased even further over the last decade. In most cases the animals die immediately or shortly after being hit by a car. Some species can also be affected at the population level and may even be faced with local extinctions due to the high number of road-kills and other negative effects of roads and traffic.

Basic data need to be collected and analyzed in order to manage highways so animal-vehicle collisions are minimized. Systematically collected data (or standardized) can help quantify the magnitude of the problem and potential changes over time. More importantly, they allow for prioritization and focusing of efforts to avoid or reduce collisions. However, not all Departments of Transportation (DOTs) or DOT districts record animal-vehicle collisions, and the DOT's that do record road-kill data often use different methods. A national standard and a tool for recording animal-vehicle collisions would allow for better integration and more effective analyses of the data. It also may stimulate DOT's and other organizations to collect these data.

Background
The main purpose of this project is to develop a standard and a tool for the collection, integration and analyses of animal-vehicle collision data. The project demonstrates how a Personal Data Assistant (PDA) in combination with a Global Positioning System (GPS) is an efficient, cost effective tool to collect spatially accurate and standardized data. If successful, the project can proceed vertically as well as horizontally. A vertical expansion would involve the development of standardized analyses of animal-vehicle collision data. A horizontal expansion could involve the development of a standard to collect other road maintenance or traffic related data that have a spatial component. The ultimate purpose is to provide both management and maintenance personnel with a toolkit that allows them to prioritize efforts and that helps them to fulfill certain tasks at the sites of interest.

The Western Transportation Institute at Montana State University (WTI-MSU) has developed"proof-of-concept" software that allows for easy, standardized and spatially precise collection of animal-vehicle collision data. The software runs on a hand held Personal Data Assistant that is linked to a Global Positioning System. The software distinguishes between "monitoring" and "incidental observation" modes and records the route of the observer. Road kill data, including species as well as optional parameters such as the sex of the animal, are stored in a separate file. The software allows for easy, spatially precise and standardized collection of animal-vehicle collision data by DOT road maintenance crews, researchers or other organizations.

Benefits

The development of a reliable, economical, user-friendly software-hardware system for recording spatially accurate road kill data will help locate important areas where transportation systems can be mitigated to reduce animal-vehicle collisions. Standardization also allows data integration across state or agency borders. If used in a systematic way, animal-vehicle collision trends can be established. Ultimately, it will make highways safer by reducing animal-vehicle collisions.

Research Plan

WTI-MSU is now poised to develop a reliable, user-friendly software and hardware package that will meet the needs of transportation agencies, land management agencies, researchers and others. The software will be customized and modified based on feedback by partners using the PDA-GPS in field demonstrations. In addition, WTI-MSU will develop procedures and software that allow for easy data management and analyses and eliminate labor intensive manual data entry. The data format will also allow for integration with spatial software in a Geographical Information System (GIS) and statistical software.

Key steps in the development of a reliable, broadly applicable PDA-GPS road kill data collection system include:

1. Select and purchase the best economic, commercially available, field-rugged PDA-GPS hardware units (at least seven).

2. Upgrade (based on previous field tests), integrate and install software (v 2.0) into new field-rugged units.

3. Select and go to four field study areas in 3 different states (VI, WA and MT) and the province of Alberta to conduct training and oversee initial use of PDA-GPS system. Modify data fields and develop new data fields and base information in software for local site needs.

4. Use feedback from field tests to update the software and develop broader applicability of system. (v. 3.0)

5. Develop a user support system to manage, store and manipulate data. Assure compatibility of v. 3.0 with ARC INFO, EXCEL spreadsheet and statistical software.

6. Assess and detail the requirements for a multi-user server system and the support required to maintain system based on v. 3.0 and its user support system.

This project will take approximately 15 months and cost approximately $120,000.

<u>Goals</u>

1. Create a user-friendly, standardized and spatially accurate animal-vehicle data collection system.
2. Create a standardized digital format and software to allow for easier and less labor intensive data integration, analyses and interpretation.
3. Use standardized animal-vehicle collision data to illustrate the magnitude of the problem, the location and ranking of problem areas, and potential changes over time. This would allow management to prioritize and evaluate efforts aimed at avoiding or reducing animal-vehicle collisions.
4. Create a system that is able to illustrate the rationale for the location and implementation of mitigation measures that ultimately lead to fewer animal-vehicle collisions, a reduction of associated human deaths, injuries and financial losses, and a reduction in maintenance costs related to carcass removal and disposal.
5. Explore the potential for expanded use of this PDA/GPS animal-vehicle collision data system beyond 4 field test sites.
6. Explore the potential for integrating animal-vehicle collision data system with other PDA/GPS systems already in use by DOT maintenance personnel.

<u>Deliverables</u>

1. Rugged hardware units for four field testing sites, two for demonstration, and one for research and programming.
2. Data collection software and user support system.
3. Data management software and user support system.
4. Training materials including a user guide and tutorial CD.
5. Evaluation Report summarizing hardware, software, and field testing as well as the potential expansion of PDA/GPS system.

<u>Staffing</u>
Co-Principal Investigator: Marcel Huijser, PhD, Wildlife Ecologist
Co-Principal Investigator: Doug Galarus, Senior Research Associate
Sean Graham, Research Associate
Amanda Hardy, Research Associate
Rob Ament, Research Coordinator
Tony Clevenger, Road Ecology Program Manager