

**EXHIBIT A**  
**SCOPE OF SERVICES**

**Cardno Contract ID / Project ID: TBD**

**Date:** 10/30/2018  
**Project Name:** Big Wood River Watershed Assessment

**Cardno**

**Name:** Cardno, Inc.  
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**Client**

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This Exhibit details the Services, Schedule, Contract Price, Additional Conditions and Additional Attachments forming part of the Professional Services Agreement, dated October 30, 2018.

**Services:** Cardno shall perform the following Services (hereafter “Services”):

**Introduction**

Cardno, Inc. (Cardno) is pleased to provide Blaine County (County) with a scope and cost estimate for completing an assessment of the Big Wood River from Stanton Crossing Bridge north to the Sawtooth National Recreation Area (SNRA) headquarters. We understand from prior meetings and phone calls with the County that the objectives for this project include:

- Identifying the historical channel migration zone.
- Identifying areas and resources at risk of flooding and severe erosion.
- Identifying and describing areas of lost or degraded riverine habitat.
- Prioritizing areas and project types for flood risk management and ecosystem restoration.
- Conceptualizing flood risk management and ecosystem restoration projects for prioritized areas that will:
  - Decrease high water impacts to communities within the study area,
  - Decrease erosion along the Big Wood River, and
  - Enhance ecosystem health along the Big Wood River and its tributaries, with special emphasis on reconnecting the floodplain and restoring natural river function.

- Discussing alternatives for balancing flood and erosion risk mitigation with ecosystem enhancement and restoration goals and objectives.
- Developing concept-level best management practices (BMPs) for flood risk reduction and ecosystem restoration projects that can be used in:
  - Prioritizing project goals,
  - Managing emergency response, and
  - Improving County floodplain and riparian area land use codes and their enforcement.
- Creating frameworks for ongoing refinement of hydro-geomorphic modeling and long-term monitoring of project successes or failures and of fisheries recovery.

Cardno is teaming with Boise-based Ecosystem Sciences (ES) on this project to develop graphic designs for an atlas mapbook deliverable.

The specific scope of work is as follows.

### **Task 1 – Background Data Review**

Much information has been developed by others that is pertinent to the project objectives and can be incorporated into or referenced in the assessment. We plan to review background information to help inform the project and to ensure our work is consistent with other prior or ongoing efforts. Specifically, we will review prior hydrologic, hydraulic, habitat, and geomorphic studies of the Big Wood River completed by Rapp, Biota, the US Geological Survey, Idaho Department of Water Resources, Idaho Department of Fish and Game (IDFG), and others, with the goal of being consistent with prior studies where appropriate and incorporating information if relevant to this effort.

#### Task Deliverables:

- Brief memorandum identifying data and data sources made available to Cardno. All referenced documents will be identified in the final report in addition to a section outlining “additional relevant information.”

#### Task Assumptions:

- The County will facilitate data requests and provide Cardno with data and reports.

### **Task 2 – Geomorphic Assessment**

The geomorphic assessment will investigate historical channel behavior in the Big Wood River in response to land development, bank armoring, flooding, and fire. This task will delineate reach breaks according to geologic and geomorphic considerations, characterize each reach using quantitative metrics, delineate the historical channel migration zone, and identify areas at risk of channel migration or erosion.

#### Task Deliverables:

- Delineation of geomorphic reaches
- Development of key geomorphic metrics for each reach
- Identification of historical channel migration zone
- Identification of channel migration/erosion hazard areas and at-risk areas
- Reporting of geomorphic assessment in final and draft report (atlas)

#### Task Assumptions:

- The County will provide 2017 light detection and ranging (LiDAR) surface for the project area.

- Channel migration and erosion hazard areas will consider only major infrastructure (i.e., roads, bridges and maintained levees) as barriers to natural migration patterns. Smaller, localized bank treatments and rock armoring will not be inventoried as part of this project and will not be evaluated as migration barriers. The County will provide data related to maintained levees.

### **Optional Task 2a – Aerial Photo Georectification**

To complete Task 2, access to georectified aerial photos is necessary. Though more recent years' aerial photos are available in this format via Google Earth, historical aeriels are not. Initial research indicates that the following historical aeriels may be available (but not georectified) for part or all of the project area: 1943, 1966, 1974, 1980, 1983, 1986, 1997, 2003, and 2006. If County geographic information systems (GIS) staff are able to georectify the photos, then this task will not be necessary. Photoperiods will be prioritized and discrete sets recommended for rectification.

### **Task 3 – Flood Hazards Assessment**

The flood hazards assessment will evaluate the flooding potential of valley areas adjacent to the river corridor. As no hydraulic modeling is being completed as part of this scope of work, flood hazards shall be evaluated by comparing floodplain topography to either the Federal Emergency Management Agency's (FEMA's) base flood elevation (BFE) or through other agreed-upon surface comparison. Hazard rankings shall be determined following a review of the LiDAR and elevation differencing within each reach, and then the hazard zone shall be applied.

#### Task Deliverables:

- Reach-by-reach flood evaluation comparing land surfaces to the FEMA BFE or other relative elevation comparison
- Identification of flood hazard severity indices
- Flood hazard zone delineation
- Documentation of key infrastructure at risk of flooding in each reach
- Reporting of flood hazards assessment to be included in final and draft report (atlas)

#### Task Assumptions:

- The County will provide FEMA BFE where available.
- The County will provide available measurements of water surface elevations during prior flood events.
- Flood hazard areas will consider only major infrastructure (i.e., roads, bridges and maintained levees) as barriers to flooding. Smaller, localized bank treatments and rock armoring will not be inventoried as part of this project and not evaluated as flood barriers. The County will provide data related to maintained levees.
- No hydraulic modeling will be completed as part of the current scope of work.

### **Task 4 – Habitat Assessment**

The habitat assessment will identify target aquatic species and consider the effects of long-term river management in the Big Wood valley on the availability and quality of their habitat. An underlying assumption of this assessment is that the Big Wood River is home to a valuable recreational trout fishery and that river management activities should be conducted in a manner that preserves existing high-quality habitats, restores habitat where feasible, and minimizes on-site or downstream impacts that could lead to habitat degradation.

#### Task Deliverables:

- Definition of key habitat criteria for target species
- Documentation of areas of known high habitat value (per other studies)

- Description of reach-by-reach habitat characteristics
- Identification of high-value areas for habitat conservation or restoration
- Reporting of habitat assessment to be included in final and draft report (atlas)

#### Task Assumptions:

- Cardno will compile and evaluate data collected by others (e.g., IDFG) (such as spawner or snorkel survey data) to identify areas of known high habitat quality.

### **Task 5 – 2019 Field Reconnaissance**

Following completion of the three-tiered assessment (i.e., geomorphic, flood, and habitat assessment) during winter 2018/2019, the project team will conduct a 2- to 3-day field reconnaissance of the project area in spring or early summer 2019. The objective of the field reconnaissance is to validate the results of the desktop analysis, collect site-specific data, ground-truth areas of uncertainty, and visit high-priority or high-hazard areas. The project team will consist of an integrated multidisciplinary team specializing in hydrology, geomorphology, fisheries, and engineering.

#### Task Deliverables:

- Brief memorandum to the County following completion of the field reconnaissance documenting tasks completed during the field visit.

#### Task Assumptions:

- Travel expenses are included in the task fee.
- Cardno will schedule the field reconnaissance to coincide timing with one of the meetings identified in Task 9 for efficiency.

### **Task 6 – Reach-Specific Project Prioritization**

The purpose of this task is to synthesize data collected in prior tasks and validated during the field visit to conceptualize flood risk management and ecosystem restoration projects in high-opportunity or high-risk areas on a reach-by-reach basis. Priority areas will be identified that have the opportunity to:

- Decrease high water impacts to communities within the study area,
- Decrease erosion along the Big Wood River, and
- Enhance ecosystem health along the Big Wood River and its tributaries, with special emphasis on reconnecting the floodplain and restoring natural river function.

#### Task Deliverables:

- Prioritization of areas and projects for flood risk management and ecosystem restoration
- Discussion of alternatives, balancing flood and erosion risk mitigation with ecosystem enhancement and restoration goals and objectives
- Reporting of reach-specific project prioritization to be included in final and draft report (atlas)

#### Task Assumptions:

- Project types will be identified and prioritized on a reach-by-reach basis based on how they will address physical and biological limiting factors. In some cases, specific project areas could be identified, while in others only concept-level projects will be identified. This assessment does not include site-level detailed project evaluation or feasibility review.

## **Task 7 – Identification of Best Management Practices and Reach-Appropriate Design Concepts**

Cardno engineers will develop a suite of design treatments and project measures that can be implemented throughout the watershed to address flood and erosion risk in a manner that is consistent with the habitat needs of target species. A library of BMPs will be developed and included in the atlas. These “typical” project types will be presented at a concept scale, not intended for construction. BMPs will be identified as appropriate for specific purposes and installation in specific environments, and identified on a reach-by-reach basis for feasibility and for addressing reach-scale issues.

### Task Deliverables:

- BMP library to be included in the atlas mapbook

### Task Assumptions:

- Draft BMPs will be developed and reviewed by the County prior to inclusion in the atlas mapbook.

## **Task 8 – Atlas Development**

The atlas mapbook design and content concepts will be developed via an integrated process that occurs over the course of the project. Zach Hill from ES will lead the atlas development and be a key member of the project team throughout the course of the project. Cardno will work closely with ES early on and during the analysis phase of the work to develop a vision for the atlas that is consistent with data collection and analysis. ES will maintain close coordination with Cardno during project kick-off and all phases of data analysis to help guide the assessment efforts for consistency with final deliverables.

### Task Deliverables:

- Atlas concept layouts
- Meeting with the County to review draft layout and content of the atlas
- Interim page samples and graphics (screenshots or similar) to share preliminary work product and review early feedback from County and Cardno prior to draft atlas development
- Draft atlas
- Final atlas

### Task Assumptions:

- All coordination, meetings, and production of all interim, draft, and final atlas products to be completed by ES are covered under this task item.

## **Task 9 – Meetings and Project Management**

This task covers labor and expense time associated with in-person meetings to be held in the County between the Cardno project team and County staff as well as larger stakeholder or public meetings. Additionally, administrative fees related to project accounting and invoicing are included in this task.

### Task Deliverables:

- Cardno will develop an agenda for each of the following proposed meetings, maintain meeting minutes, and provide minutes to the County within 5 business days of each meeting:
  - Kick-off meeting
  - Meeting following data analysis to discuss results
  - Meeting to discuss atlas content and layout (perhaps coincident with the spring 2019 field reconnaissance)

- Draft atlas review
- One public presentation or stakeholder meeting

#### Task Assumptions:

- The fee estimate assumes only the Cardno project manager will attend all meetings in person. Other staff can be available as needed via phone or video conference.
- One meeting can be attended by the full project team if it coincides with the spring 2019 field reconnaissance.

### **Schedule, Cost Summary, and Terms**

The current schedule is proposed to complete the draft assessment by August 16, 2019, and the final assessment by October 18, 2019, following one round of County and stakeholder review.

The cost estimate for the above scope of work is \$170,000, excluding optional Task 2a, according to the task breakdown in the table below.

Task	Fee
<b>1. Background Data Collection and Review</b>	\$8,000
<b>2. Geomorphic Assessment</b>	\$31,000
<b>3. Flood Hazards Assessment</b>	\$19,000
<b>4. Habitat Assessment</b>	\$18,000
<b>5. Field Reconnaissance</b>	\$15,000
<b>6. Reach-Specific Project Prioritization</b>	\$11,000
<b>7. Identification of BMPs and Reach-Appropriate Design Concepts</b>	\$15,000
<b>8. Atlas Mapbook Development</b>	\$35,000
<b>9. Meetings and Project Management</b>	\$18,000
<b>TOTAL</b>	\$170,000
<b>Optional Task 2a. Aerial Photo Georectification</b>	\$1,000 per set