A – Project Description and Schedule

Description

1. Background to Project

The Lethbridge Research and Development Centre is looking to replace their existing wheel/hand move irrigation system with a lateral move irrigation system. The proposed system will irrigate research plots used for plant science and a long-term cropping systems study, known as “Rotation U” (Figure 1).

Figure 1: LRDC Centre, Lethbridge, Alberta – Proposed Irrigated Area (Highlighted)

The long-term nature of the research - makes it imperative for a replacement irrigator to have wheel tracks align with existing plots to minimize the impact on the studies and ensure continuity going forward. Agriculture and Agri-Food Canada is requesting proposals for a customized 6-tower lateral move irrigation system, with drag-hose, underground hook-up to existing irrigation pipe, and electrical connection to existing 3-phase power supply .

2. Schedule

The Contractor must complete the supply of all materials including lateral irrigation system, pipeline, electrical and fittings at Lethbridge Research and Development Centre by **March 31, 2023**. Underground water supply lines, construction of hydrants and electrical receptacles are to be completed by May 15, 2023. Commissioning of the system and training in control panel operation must be completed by May 31, 2023.

3. Scope

The proposal shall be for work consisting of the supply of all plant, labour, services, materials and installation of a lateral move irrigation system, electrical connections between onsite power service and lateral, and piping/connections to the existing piping infrastructure. All proposals shall meet the minimum requirements specified herein or equivalent alternative as approved by Canada.

3.1 Drawings

The following drawings are made a part of these specifications:

Drawing	Title
#3936-1	OVERALL SITE PLAN
#3936-2	DETAILS

3.2 Lateral Move Requirements

3.2.1 Lateral is to be complete with 6 spans and an overhang

3.2.2 Lateral span lengths must be customized such that wheel track follows pathways between existing plots with lengths specified in Table 1. Span lengths may be altered using spacers/spools to ensure that wheel tracks follow specified placement.

Table 1: Custom Linear Span Length and Tower Locations

	Span Length		Position of wheel track	Cumulative distance m (ft)
	m	Feet		
Supply Cart	0	0	10 ft S center of south-most plot path	0
Tower 1	35.36	116	Path between 10 & 1	116
Tower 2	48.46	159	Center plot 9	275
Tower 3	48.46	159	Path between plots 7 & 8	434
Tower 4	48.46	159	Center plot 6	593
Tower 5	48.46	159	Path between plots 4 & 5	752
Tower 6	48.46	159	Center plot 3	911
Over-hang	16.15	53	Over-hang above N½ plot 3	964

3.2.3 IF Contractor cannot meet spacing requirements (Table 1); alternatives, such as alternating standard span lengths, may be considered by CANADA such that options minimize impact on existing plot spacing shown in Drawing #3936-1.

3.2.4 Overhang length should be as close to specified length as possible (16m/53ft), although may be shorted to meet manufacturers standard length.

3.2.5 Span pipe must be minimum 4.5" nominal diameter and/or of suitable size to structurally maintain the span lengths specified in Table 1.

3.2.6 All metal components, including nipples, fittings etc., must be hot dipped galvanized steel.

3.2.7 Tires must be new, minimum size 14.9" x 24" with tubes, semi-flotation with galvanized rims.

3.2.8 The outlets across the machine must be spaced to work with specified nozzle package. Extra outlets must have galvanized plugs.

3.2.9 Nozzle Package

3.2.9.1 Nozzles must be Nelson O3030 Orbitor with standard Angle 9-Grove black plates OR Senninger I-Wob2 with standard angle 9-Grove plates OR Canada Approved Equivalent.

3.2.9.2 Individual nozzles must be equipped with ball valve or equivalent to allow operator to manually turn individual nozzles on or off.

3.2.9.3 Nozzles must be equipped with a dual nozzle option, including nozzle clip or holder, designed to deliver **200 usgpm** or **400 usgpm**.

3.2.9.4 Nozzles must be equipped with 103 kPa (15 psi regulators).

3.2.9.5 Nozzles must be mounted on flexible drop hose c/w weights with nozzles approximately 1.8m (6ft) from ground level.

3.2.9.6 The system must be capable of operating with all nozzles operating or with ⅓ or ⅔ of the nozzles shut off (manually, for research experiments)

3.2.9.7 Nozzles must be sized and evenly spaced at the approximate interval specified by the nozzle manufacturer to optimize uniformity across the entire system.

3.2.10 A sand trap must be installed at the end of the lateral move system, allowing for removal and flushing of the system.

3.2.11 The lateral system must be capable of irrigating in forward and reverse.

3.2.12 Heavy Duty Gear boxes, drive, and motors must be complete with system.

3.2.13 Guards must be install between gear boxes and motors to protect drive shafts.

3.2.14 The drive cart must be capable of pulling 80m (262 ft) of drag hose with a minimum inside diameter of 100mm (4”). Contractors are responsible for ensuring drive cart is of sufficient size for lateral system length and field topography.

3.2.15 The drive cart must be located at the end of the lateral move system (south edge) and outside of the field plot area.

3.2.16 The drive cart must come complete with electrical cable and connections to connect lateral to electrical outlet pedestal. Cable length must be designed to work with system and of sufficient length 80m (262ft) for the lateral to travel between connection points. Power supply drag cord c/w male connector and cable grips suitable for this application. An end of cord shut-off must be installed on drag cart. It is the Contractors responsibility to ensure cord end is compliant with 3-phase power connection supplied by others and meets current CSA standards.

3.2.17 The drive cart must have a center swivel connection to manage the hose, enabling auto reverse without the need for disconnecting and re-aligning the hose outside of the drive path.

3.2.18 System must be complete with a drag hose having a minimum inside diameter of 100mm (4”) high density polyethylene (HDPE) pipe, or Canada approved equivalent suitable for this application. Total length of drag hose shall be a minimum of 80m (262 ft). Connections from the drag hose to the lateral and from the drag hose to a hydrant riser are the responsibility of the Contractor.

3.2.19 Contractors are responsible for supplying a 100mm (4”) 90^{o} valve opening elbow compatible with the drag hose connection and 100mm (4”) hydrant riser.

3.2.20 Lateral move must be complete with Global Positioning System (GPS) guidance and tower alignment system.

3.2.21 Lateral must have a computer control panel with GPS compatibility. Minimum features to include programmable stop/start times, water application rate, field position, and temperature/pressure/ flow readouts.

3.2.22 Computer control panel must be equipped for telemetry allowing for notifications and control with a cellular device.

3.2.23 Lateral must be complete with lightning arrester to comply with CSA Standard C233-1972 or most current standard.

3.2.24 Lateral must be equipped with a Nelson 800 series control valve with solenoid on/off mounted on the lateral riser pipe. Valve must be linked to the lateral control panel for low pressure, alignment, power interruption, end of field and scheduled shut off.

3.2.25 End of field shut-off arms c/w manufacturers recommended barricades must be included. Barricades must be placed on each end of the field either in line with drag cart tower or end tower (total of 2 barricades).

3.2.26 An electronic flow meter and pressure sensor must be installed and have ability to communicate with the manufacturers control panel.

3.3 Electrical Requirements

All electrical equipment and material for the lateral move irrigation system and connections between three-phase power supply and the lateral move irrigation system must be new and conform to the standards of the Canadian Standards Association.

Installation of equipment must meet the requirements of the current edition of the Canadian Electrical Code, applicable Provincial and Municipal regulations and codes; and the current ASAE Standard for this type of application. In no instance shall the standards and recommendations established by the manufacturer be reduced by any codes or regulations referred to above.

3.3.1 The system shall use a three-phase electrical supply

3.3.2 Contractor is responsible for arranging connection to the existing three phase power supply, including supply of required transformers, meters, drops, disconnects and fusing.

3.3.3 Contractor is responsible for supply and installation of buried electrical cable between three phase over-head lines and lateral move irrigation system electrical pedestals. Including location of existing services to accommodate the installation.

3.3.4 Buried electrical cable must be armored and suitable for use in the proposed system. Contractors shall familiarize themselves with the site to determine the appropriate location of electrical supply and pedestal placement estimated in Drawing #3936-2.

3.3.5 Supply of electrical pedestal plugs to connect buried electrical cable to lateral move electrical drag cable. Plugs must be switched allowing operator to open/close electrical circuit prior to disconnecting electrical plug.

3.4 Pipeline Requirements

The proposed lateral move irrigation system will utilize the existing irrigation water supply pipeline. Contractors will be required to connect into the existing pipeline mainline and install the required connections, fittings, pipeline extension, hydrant risers and thrust blocking. This includes trenching, bedding, blocking and site clean-up.

3.4.1 Supply and install of two riser hydrants with locations detailed in Drawing #3936-2

3.4.2 Supply and installation of a 250mm x 250mm x 150mm Steel Tee and 250mm repair sleeve Detail B Drawing #3936-1/2, into the existing 250mm Series 125 pipeline (diameter to be confirmed at site visit).

3.4.3 Supply and installation of a 150mm diameter Series 125 PVC irrigation pipe. Pipeline length shall connect from the existing pipeline location to the position of the J-riser hydrant fitting as detailed in Detail A Drawing #3936-1/2.

3.4.4 J-riser hydrant shall connect to 150mm diameter Series 125 PVC irrigation pipe c/w 100mm diameter hydrant riser end located above ground level.

3.4.5 Supply and install of a 200mm x 200mm x 150mm Steel Tee and 200mm repair sleeve Detail C Drawing #3936-1/2, into the existing 200mm Series 125 pipeline (diameter to be confirmed at site visit).

3.4.6 Supply and installation of a two 150mm diameter Series 125 PVC irrigation pipes and a 150mm diameter steel 90^{o} elbow. Pipeline length shall connect from the existing pipeline location to the position of the J-riser hydrant fitting Detail C Drawing #3936-1/2.

3.4.7 J-riser hydrant shall connect to 150mm diameter Series 125 PVC irrigation pipe c/w 100mm diameter hydrant riser end located above ground level.

3.4.8 All below ground steel fittings shall be hot dip galvanized steel or powder coated to prevent corrosion.

3.4.9 Hydrants shall be placed at location to allow adequate offset for movement of the lateral move irrigation system between the field plot edge and riser hydrants, and such that the lateral can travel the length of the field using the specified drag line. Approximate location is outlined in Drawing #3936-2.

3.4.10 Installation shall be complete with adequate concrete thrust blocking installations (Drawing #3936-2). The Contractor shall be responsible for the supply and placement of concrete of suitable workability. Concrete shall be in accordance with CSA Standard CAN3-A23.1-04 in all respects. Specified strength shall be 30 MPa.

3.4.11 Concrete shall be manufactured using Type HS sulphate resistant cement of a recognized standard brand complying with CSA A3001.