SPECIFICATION

PART 1 – GENERAL

1.1 INTRODUCTION

A. The Poirier Sport and Leisure Complex in Coquitlam, British Columbia, is a versatile facility that spans 190,000 square feet and offers a variety of ice skating, aquatic, fitness and dry floor programs as well as drop-in classes. It's also the home of the Coquitlam Sports Hall of Fame.

B. The existing double-sided marquee sign includes two 3'-9 1/16" high x 7'-9 7/16" wide 20mm pixel pitch LED displays. The bottom of the LED displays are 11' 4" above grade. Now past end of life, the current LED displays require replacement.

C. This Section includes requirements for the LED Displays & Associated Systems. It includes, but is not limited to the following:

1. Double-sided LED Outdoor Display
2. Control Software
3. Vinyl Wrapping
4. Electrical

1.2 The Poirier Sport and Leisure Complex construction site will be open as determined by the Owner. The Contractor will co-ordinate access at all times.

1.3 DEFINITIONS

A. "Consultant": VWMason Technology Consultants Ltd. and its authorized representatives referred to throughout as if singular in number.

B. "Contractor": the proponent awarded the contract to supply and install the LEDSYS, including their authorized representatives, referred to throughout as if singular in number.

C. "Outdoor LED & Associated Systems": the marquee video display, processing, and related systems. The scope of this specification. Referred to as the "LEDSYS" throughout the Specification document.

D. "Owner": The City of Coquitlam, and its authorized representatives including the project manager, staff, Consultant, and other project consultants, referred to throughout as if singular in number.

1.4 SCOPE OF WORK OVERVIEW

A. Provide the design, engineering, labour, supplies, materials, tools, test equipment, transportation, offloading, supervision, and coordination required to complete the supply, installation, training, and commissioning of the LEDSYS as described in this Specification, schedules, attachments, and related drawings.

B. The LEDSYS includes the following components and systems:
   1. Two-sided 4’ 2” high x 7’ 6” wide (cabinet size) 10mm pixel pitch LED video display. The displays will be installed on each side of the existing single pylon sign.
   2. LED Displays Control, Image Processing, and Signal Distribution.
   3. Vinyl wrapping for the existing steel structure.

C. The Contractor is responsible for the demolition and removal of the marquee LED and all related control and signal distribution equipment.

D. The Contractor is responsible for providing a complete and operational LEDSYS that meets all requirements of this Specification.

E. The Contractor must be thoroughly knowledgeable and acquainted with the complete contents and requirements of this section.

F. The LEDSYS must be designed and completed by the Contractor according to the contract documents, as well as all applicable civic, provincial, and national codes and regulations, manufacturer requirements and specifications, and industry best practice.

1.5 RELATES REQUIREMENTS

A. The Contractor is responsible for all required scopes of work including the following related sections:

   1. Section 26 05 00: Electrical General Requirements
   2. Section 05 12 00: Structural Steel Requirements

1.6 REFERENCES

A. Published specifications and standards by trade, industry, and governmental organizations apply the design, construction, and installation of the LEDSYS. The Contractor and its sub-contractors and suppliers will have knowledge of these standards where they apply to the work required within this Specification and comply with their requirements as it applies to the project work. These specifications and standards include, but are not limited to:
   1. ANSI/EIA/TIA-526: Standard Test Procedures for Fibre Optic Systems
   2. ANSI/EIA/TIA-568-C.0: Generic Communications Cabling for Customer Premises
   3. ANSI/EIA/TIA-568-C.1: Commercial Building Communications Cabling Standards, Part 1: General Requirements

4. ANSI/EIA/TIA-568-C.2: Balanced Twisted-Pair Communications Cabling and Components Standard
5. ANSI/EIA/TIA-568-C.3: Optical Fibre Cabling Components Standard
6. ANSI/EIA/TIA-569-A: Commercial Building Standard for Telecommunications Pathways and Spaces
7. ANSI/INFOCOMM 10:2013 Audiovisual Systems Performance Verification
8. ANSI/INFOCOMM 2M-2010 Standard Guide for Audiovisual Design and Coordination Processes
9. AVIXA F501.01:2015 (Formerly INFOCOMM F501.01:2015), Cable Labeling for Audiovisual Systems
10. AVIXA V202.01:2016 (Formerly ANSI/INFOCOMM V202.01:2016), Display Image Size for 2D Content in Audiovisual Systems
11. BC Building Code 2018 (BCBC)
12. CAN/CSA Standards of Canadian Standards Association
13. Canadian Electrical Code C22.1- 2018 Edition (CEC)
14. Canadian Electrical Manufacturers Representatives Association (CEMRA)
15. Canadian Radio-television and Telecommunications Commission (CRTC) rules and regulations
16. Designed to current UBC or IBC standards
17. FCC Class A Compliant
18. Federal Communications Commission Regulation Part 15
19. Middle Atlantic Products “Integrating Electronic Equipment and Power into Rack Enclosures” Rev. 4b
20. Regulations of local inspection authorities having jurisdiction
21. Society of Cable Television Engineers (SCTE)
22. Society of Motion Picture and Television Engineers (SMPTE)
23. Standard for Electric Signs, UL and CUL Listed
24. Standard Integration Practices
25. Standard for Control Centers for Changing Message Type Signs
26. Underwriters' Laboratories of Canada (ULC)
27. Other applicable codes, standards, and installation procedures consistent with recognized industry trends and generally accepted procedures.

1.7 RESPONSIBILITY AND RELATED WORK

A. Existing sign drawings are provided as part of this Specification. The purpose of these drawings is to illustrate the structure and location of the new LEDSYS; they are not construction drawings. The Contractor is responsible for completing all design and engineering for structural and electrical components and systems. All drawings must be stamped by a professional engineer licensed to practice in the province of British Columbia.

B. The Contractor is responsible to ensure all the Work is done in accordance with all codes and authorities having jurisdiction, including submission for any required permits and inspections by authorities having jurisdiction.

C. The Contractor must verify all dimensions and site conditions to ensure the proper placement of all equipment, systems, and electrical services prior to submitting drawings for approval and

prior to commencing work. This includes the verification of the existing structure to ensure that is can accommodate the new LED Display.

D. To maintain quality assurance, the Contractor will regularly review all project documentation and site conditions to ensure that the work of others as it pertains to the LEDSYS is developing as expected. The Contractor will promptly report any deficiencies, errors, omissions, discrepancies, or matters requiring clarification to the Owner in writing.

E. The Contractor is responsible for the demolition, removal, and disposal of the existing marquee LED displays.

F. The Contractor must coordinate with the Consultant and the Owner to ensure the seamless integration of the new LEDSYS processing and signal distribution. All new equipment is to be installed in the existing equipment racks.

G. The Contractor is required to retain the services of a structural engineer licensed to work in the province of British Columbia to review the attachments of the new marquee LED displays to the existing steel structure. The Contractors' responsibilities include a detailed engineering review and stamped drawings. All required structural drawings will be reviewed by the Owner.

H. The Contractor is required to connect to the existing electrical service in the Poirier Sports and Leisure Complex main electrical room (primary power). The maximum electrical service is 200A 208V 3-Phase.

I. The Contractor is responsible to design, engineer, supply, and install all electrical distribution (secondary power) within the existing pylon to the new outdoor marquee LED display. The Contractor must retain the services of an electrical engineer licensed to work in the province of British Columbia. The Contractors' responsibilities include a detailed engineering review and stamped electrical drawings. All required electrical drawings will be reviewed by the Owner. The Contractor will provide all secondary power connections/terminations required to power new systems based on code and product requirements.

J. The Contractor is responsible for assembly, modifications as required, and mounting of all components onto the existing steel structure.

K. The Contractor will design and engineer the final aesthetic look of the displays and structure in the LEDSYS. Include all flashing and other finishes required to maintain a seamless aesthetic. No visible gaps, wiring, unfinished structure, or unfinished components are to be visible. Final designs are to be reviewed by the Owner’s Consultant prior to beginning work.

L. The Contractor will design, print, and install a new vinyl wrap for the existing structure in accordance with the documents: Parks Wayfinding Design Standards (CEDMS 3156569) (1) and Complete Coquitlam Graphic Standards.pdf

M. All shop drawings, schematic diagrams, and connection diagrams will be reviewed by the Owner’s Consultant prior to beginning work. The design intent of the wiring is to fully inter-connect the equipment to utilize its capabilities.

N. The Contractor will supply and install all required transmission devices, copper and fiber control cable, and signal cabling needed to make the new components complete and fully operational.

O. In order to provide a complete working system, the Contractor will supply and install: all specified products, required accessories, necessary adapters, all installation materials, shop supplies, tools, minor equipment, spare parts, and documentation without claim for additional payment.

P. The Contractor will maintain an experienced superintendent and necessary assistants, one or more of who must always attend the Poirier Sports and Leisure Complex during the installation of the LEDSYS. The superintendent will act as the Contractor's authorized representative at the site and be approved by the Owner.

Q. The Contractor is required to seek approvals from the Owner to connect any IT component to the Owner’s networks. Approvals may not be granted, depending on the hardware and/or software specifications.

R. The Contractor will provide licenses for all software required to make the LEDSYS fully operational. Copies of all proprietary programming and software licenses will be included in the contract closeout submittals.

S. The Contractor will operate all required equipment to test the system and its components completely.

T. Other related LEDSYS Integration responsibilities include but are not limited to:
1. Coordination with other trades.
2. Delivery of submittals.
3. Commissioning and testing of all systems and installed equipment.
4. Adjustments and changes to the system to ensure proper function.
5. Written report detailing commissioning and test results.
6. Operator training and operator manual preparation and delivery.
7. Warranty services.

1.8 PRECONSTRUCTION SUBMITTALS

A. Review of the submittals by the Consultant is for purposes of tracking the work and contract administration and does not relieve the Contractor of responsibility for any deviation from the Contract Documents, or from providing equipment and/or services required by the Contract Documents which were omitted from the submittals.

B. No portion of the project will commence, nor will any equipment be procured until the preconstruction submittals (including product data and shop drawings) have been approved in writing by the Consultant. All installations will be in accordance with the Contract Documents.

C. All submittals will be accompanied by a letter of transmittal identifying the name of the project, Contractor's name, date submitted for review, and a list of items transmitted. Provide submittals in as few PDF files as possible.

D. Preconstruction Information Submittals: within 7 calendar days of issuance of contract award, and before ordering equipment or beginning work, the Contractor will supply the following for approval:
   1. Project Team:
      a. The Contractor will clearly identify project team members and that statement will include name, years with firm and a brief resume of the employees past projects and education. Pertinent team members that are to be identified will be Project Manager, Designer, Site Supervisor, and Programmer(s).
   2. Project Schedule:
      a. A Gantt chart showing the timetable for the work. As the construction schedule advances, revise, and resubmit the chart to show rescheduled work and milestones achieved.

E. Preconstruction Work Submittals: within 21 calendar days of issuance of contract award, and before ordering equipment or beginning work, the Contractor will supply the following for approval:
   1. Security and risk assessments
      a. Identification of threats and vulnerabilities.
      b. Risk prioritization.
      c. Mitigation strategies.
   2. Privacy Policy
      a. Detail corporate privacy policy including:
         1) Data collection and usage
         2) Security measures
         3) User rights
         4) Data retention
         5) Compliance
   3. Product Data:
      a. A complete list of products to be supplied accompanied by manufacturers' datasheets.
      b. Product list and data sheets are to be compiled to match the order of this Specification and attached Appendix (if applicable).
      c. Index product data sheets by manufacturer, model, and part number. If the product datasheet lists more than one product, mark the appropriate product with an arrow.
      d. A detailed list of all manufacturer product warranty information. Provide list in a spreadsheet format.
      e. Provide submittal as a single PDF file.
   4. Shop Drawings:
      a. Provide detailed engineered shop drawings of all custom components and connections, including all weight calculations and power requirements.
      b. Schematics:
         1) Include comprehensive functional schematic one-line drawing for all systems within the scope of work.
         2) Provide names, model numbers, and descriptions of all components.
         3) Detail all connection points, interconnecting wires, and location:
            a) Show at each terminal point the type of connector to be used and include a typical wiring detail of each connector.
            b) Call out wire types and color-codes where appropriate.

c) Assign wire numbers and patch-bay locations to every wire and patch point.
d) Show unused electronic equipment termination points, i.e., input/output ports as “Future”.

4) Cross reference and label all wiring on the written lists and line drawings.
5) Include drawings of custom circuitry including:
a) Receptacle pin numbers and component callouts
b) Details of custom resistive combining networks, filter, or pads
c) Point-to-point wiring drawings for control system modules and interfaces, and for switches or relays

c. Installation Drawings.
1) Provide drawings showing unique details of the manufacturers’ installation methods specific to each product if, not contained in the manufacturers’ datasheets.
2) Include details and dimensioned drawings for all custom manufactured components. Include plan views and elevations.
3) Include drawings detailing LED screen assembly, structure, cover, and service access.
4) Schedule all required laminated labels, their sizes, and to which equipment they will be attached.
5) Other relevant details pertaining to the work.
6) Architectural technical diagrams

5. Create the drawings listed above with Revit, AutoCAD, or Visio Professional using schematic icons and graphics standard to the AV Industry.
6. All drawings must be produced at an appropriate scale with a sheet size no smaller than 11x17 inches.

1.9 CONTRACT CLOSEOUT SUBMITTALS

A. The Contractor will provide an organized compilation of site conditions, testing, measurement data, as-built drawings, and operation and maintenance manuals to the Owner a minimum of one (1) week before application for substantial completion of the LEDSYS.

B. Provide the following Contract Closeout information in PDF format as a single file:
1. A cover page and table of contents.
2. Relevant certificates issued by authorities having jurisdiction including.
3. Field changes of dimension and detail.
4. Changes made by change orders.
5. Details not on original Contract Drawings.
6. Cable testing reports.
7. Grounding measurements.
8. Video system calibrations and verifications.
9. Other Documents include but are not limited to manufacturer's certifications, inspection certifications, field test records required by individual specifications sections.

C. As-Built, Operation & Maintenance Manuals:

1. The Contractor will provide an organized compilation of as-built drawings, documents and records describing the installation, operation, and maintenance of individual products or systems described in this Specification.
2. All drawings must be produced at an appropriate scale with a sheet size no smaller than 11x17 inches.
3. As-built drawings should include but are not limited to:
    a. Plan view, schematic, and other drawings.
    b. Detailed list of equipment with serial numbers, IP and MAC addresses, passwords, etc., indexed by manufacturer, model, and part number. Update this list following Acceptance Testing if any equipment changes.
    c. Supplement product data with drawings to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
4. Submit as-built drawings as a single PDF document.
5. Operation and maintenance manual should include but are not limited to:
    a. Digital drive of equipment product data sheets indexed by manufacturer, model, and part number. Provide link to access files online. If the product datasheet lists more than one product, mark the appropriate product with an arrow.
    b. Digital drive of equipment operation manuals, indexed by manufacturer, model, and part number. Provide link to access files online.
    c. Equipment manufacturers maintenance procedures. Include demonstration videos, photos, and/or diagrams.
    d. Suggested maintenance schedule. Weekly, monthly, and/or annually.
    e. Spare parts lists:
        1) Source of spare parts for materials that are not kept at the site.
        2) List of spare parts that are required to be kept at the site.
    f. Suppliers for service, warranty, and replacement – name, address, and telephone number.
    g. Certification, guarantee, and warranty details for all parts and labour, including manufacturer warranty for all equipment. Highlight or summarize the duration of warranties.
6. Submit operation and maintenance manual as a single PDF document if possible, or organized collection of PDF documents with master table of contents.

1.10 SUBMITTAL REVIEW:

A. Submit PDF copies of all submittals described in this Specification to the Consultant for review and distribution to the Owner for approval.

B. Submission of individual or partial data will not be accepted; only complete documents will be reviewed.

C. Allow a minimum of seven (7) business days for review of all submittals.

D. Resubmission Requirements:
1. Make any requested corrections or changes in submittals.
2. Resubmit for review until no exceptions are taken.
3. Indicate any changes that have been made other than those requested.

1.11 WARRANTY AND SERVICE

A. The Contractor will provide a minimum one (1) year parts and one (1) year onsite labour, comprehensive warranty on all portions of the LEDSYS. This comprehensive warranty will commence upon the Consultants' sign off on substantial completion or first event use (whichever is later). The minimum warranty does not reduce the longer-term warranty offered by each manufacturer on its product. Warranty requirements include:
   1. During the term of the warranty, the LEDSYS is free from deficiencies and continue to operate as per the standards and requirements included in this Specification.
   2. Re-installed Owner components are excluded from the minimum warranty. All new structures, electrical, and low voltage cable associated with the re-installation of these displays are included in the minimum warranty.
   3. The Contractor must repair or replace all defects in parts, labour, or materials during the warranty period. All repaired or replacement parts must be returned to the Owner within (20) business days of receiving notification of the part failure by the Owner.
   4. During the warranty period, all necessary part repair and or replacement parts must be pre-paid both ways to and from the authorized repair depot.
   5. During the warranty period, the Contractor will ensure that an on-site service agent arrives at Poirier Sports and Leisure Complex not more than 24 hours from the time their presence was requested by the Owner.
   6. The Contractor will provide telephone technical assistance and support from 8am to 11pm MST time, 7-days a week.
   7. All requests for information and/or service must be processed within four (4) hours during the full term of the warranty.
   8. The Contractor must maintain a parts exchange program for all key components of the LEDSYS, and same day ship any part not included in the Owners inventory of spare parts for the full term of the warranty.

B. The following terms apply to all new LED displays that are part of the LEDSYS:
   1. Provide 5 years of parts coverage
   2. Provide toll-free service coordination
   3. Provide a toll-free help desk number that will be staffed from 7 a.m. to 7 p.m. Central Time
   4. The warranty will cover all equipment, including processors, controllers, operating systems, and software.
   5. The Contractor/LED display manufacturer must provide a 100% diode warranty without exclusions.
   6. The Contractor/LED display manufacturer must replace all defective LED diodes with diodes from the original lot for the full term of the warranty.
   7. The Contractor will ensure that all system components and required parts remain available to the owner by the original manufacturer for a minimum of (5) years after receipt of contract closeout submittals.
   8. When the manufacturer discontinues production of any parts used in the LEDSYS, the Contractor will immediately notify the Owner in writing, and provide the Owner the opportunity to purchase a final supply of parts.
   9. If a repair is completed using any portion of the Owner’s spare parts allotment. Contractor will replenish all parts used and maintain the Owner’s inventory at the quantities detailed in this Specification. This includes parts replaced during initial testing and commissioning.

10. The Contractor will complete on-site system maintenance and testing every six months during the full term of the warranty period. A regular maintenance visit is to be scheduled approximately 1 month prior to the start of the sports season, or as determined by the Owner.
11. On-site maintenance will include but is not limited to full system testing, inspections, and replacement as required of all parts, and system performance testing and measurements, including LED brightness. All findings are to be provided to the Owner in writing upon completion of the maintenance.

PART 2 - PRODUCTS

2.1 GENERAL

A. All equipment and materials, except Owner furnished, are new and the most recent version available and will must conform to applicable UL or ANSI provisions. Re-manufactured or “B” stock equipment is not acceptable.

B. Refer to the attached drawings to determine design intent, location, product quantities, and other LEDSYS information. If a discrepancy is found, the Contractor must obtain written instruction from the Consultant prior ordering or installing equipment. If instruction is not obtained it will be assumed that the more expensive options will be required.

C. All the equipment listed in this Specification is part of an integrated design. Alternates and substitutions will not be accepted without the written consent of the Consultant.

2.2 LED DISPLAYS

A. Basis of design: Daktronics GT6x-108-216-10-RGB-2V

B. Cabinet Construction
   1. Cabinet dimensions shall not exceed 4 feet 2 inches high by 7 feet 6 inches wide. The front-to-back cabinet depth shall not exceed 7 inches.
   2. The cabinet shall contain a full LED matrix measuring a minimum of 108 pixel rows high by 216 pixel columns wide.
   3. Cabinet display configuration is:
      a. Two-View (2V), two one sided displays typically installed back-to-back and show same content on both sides.
   4. The distance from the center of one line or column of pixels to the center of all adjacent lines or columns shall be 10.16 mm (0.4”) both horizontally and vertically.
   5. Maximum display power per face shall not exceed 1895 watts when 100% of the pixels are operating at their maximum possible drive current.
   6. Cabinet weight per face shall not exceed (275) lbs/(125) kg.
   7. Display shall operate from the following power sources: 120/240 VAC, 60 Hz single-phase, including neutral and earth ground.
   8. Display shall operate in a minimum ambient temperature range of -40° to +120°F (-40 to +50°C) and to a 95% humidity.

9. Internal display component hardware (nuts, bolts, screws, standoffs, rivets, fasteners, etc.) shall be fabricated from stainless steel, aluminum, nylon, or other durable corrosion-resistant materials suitable for the signage application.
10. Electrical display components shall be 100% solid-state.
11. The presence of ambient radio signals and magnetic or electromagnetic interference, including those from power lines, transformers, and motors, shall not impair performance of the display system.

C. Housing Frame
1. Display materials shall use non-corrosive materials or have a protective coating so they shall be anti-corrosive and not degrade or oxidize.
2. Adequate ventilation shall be provided through convection without the need to provide extra space around the sides or behind the display.
3. Steel mounting points that can be used for mounting purposes shall be provided with the display and have the ability to be adjusted for alternative mounting methods.
4. Shall include lifting supports that can be removed after installation.
5. Exterior Finish.
6. The LED display border pieces shall be coated with an automotive-grade acrylic urethane paint.

D. Front Face Construction
1. To meet the display readability requirements, the front face must be constructed in such a manner that it provides high contrast, low sunlight reflection and durability in all weather and site conditions.
2. Minimum features of front face shall:
   a. Include horizontal louvers for contrast enhancement.
   b. Include vertical ribbing for contrast enhancement.
   c. Use surface materials in the active LED area, such as metal, plastic, or other face materials, designed for low sunlight reflectivity.

E. Serviceability
1. The display housing shall provide safe and convenient front service access for all modular assemblies, components, wiring, and other materials located within the housing.
2. All internal components shall be removable and replaceable by a single technician with basic hand tools.
3. Service access shall be easily obtained by removal of one or more modules in front of the associated internal component.
4. Each module should allow simple removal with a single latch system.
5. Displays shall be designed with service features that minimize potential bodily harm.

2.3 DISPLAY COMPONENTS

A. LED display modules shall be constructed for good readability, long life, and ease of service. Each display module shall be constructed as follows:

1. Each module within the product family shall be designed with the same physical footprint of 14.4” x 14.4”.
2. All modules and their components shall be fully encapsulated and sealed to meet IP-67 standards.
3. An LED module shall consist of LEDs with all drive electronics mounted on a single Printed Circuit Board (PCB).
4. LEDs shall be auto-inserted in order to maintain quality and uniformity of the LEDs within each LED module.
5. All PCBs shall be wave-soldered to ensure uniformity, quality, and durability of all solder joints.
6. All PCBs shall be cleaned in a manner so as not to contain more than 2 parts per million contaminants.
7. Module signal and electrical connections shall be of the positive locking and removable type. Removal of a module from the display shall not require a de-soldering operation.
8. Data to the modules shall be redundant in that the signal can reach the module from multiple directions in the event of a loss in signal path from either direction.
9. All LED display modules in a single display shall be identical in construction and interchangeable throughout the display with the ability to be field calibrated.
10. All module rows shall include continuous louvers over the LEDs for sunlight shading and enhanced contrast.
11. Modules shall be individually attached to the cabinet frame.
12. Removal of one or more modules shall not affect the display’s structural integrity.
13. The distance from the center of one line or column of pixels to the center of all adjacent lines or columns shall be 10.16 mm (0.4”) both horizontally and vertically.
14. The failure of a single pixel, module or power supply shall not cause the failure of any other pixel, module or power supply in the display.
15. All modules shall have no less than a 160° horizontal half-intensity viewing angle.
16. The transition of viewing intensity shall be consistent throughout the viewing cone.

B. Pixels shall conform to the following specifications:
   1. Surface mount device LEDs shall be mounted to the surface of the circuit board.
   2. LEDs shall be non-diffused, ultra-bright, solid-state light emitting diodes.
   3. The red LEDs shall be constructed of AlInGaP technology and the green and blue LEDs shall be constructed of InGaN technology.
   4. Each color of LEDs used in all LED displays provided for this contract shall be from the same bin.
   5. LED half-life shall be an estimated minimum of 100,000 hours.
   6. Display shall have a minimum intensity of 8,000 cd/m2 for RGB maximum light output.

C. Power Supply
   1. All power supplies shall be regulated, auto-ranging AC to DC power, with protection for the LED pixel, LED display and driver circuitry in the event of power spikes or surges.
   2. Each power supply and their connectors shall be fully sealed to protect from corrosive environmental factors meeting IP-67 standards.

D. Internal Wiring

1. Wiring for LED display modules and other internal components shall be installed in the housing in a neat and professional manner.
2. Wiring shall not impede the removal of display modules, power supplies or other display components.
3. Wires shall not make contact with or be bent around sharp metal edges.
4. All wiring shall conform to the National Electric Code.

E. The display shall be protected from electrical spikes and transients.

F. The manufacturer shall provide an earth-ground lug on the display.

2.4 DISPLAY PERFORMANCE

A. Display Capability
1. The LED display shall present messages that are continuous, uniform, and unbroken in appearance.
2. The LED display shall be capable of producing 281 trillion colors for RGB at all dimming levels.
3. Each display pixel shall be composed of one surface mount LED containing one each – red, green, and blue LED within a single package.
4. The LED display shall be capable of displaying all true type fonts.
5. The display shall be able to display messages composed of any combination of alphanumeric text, punctuation symbols, graphic images, and pre-canned video files.
6. Video and message files shall have up to a 30 frame per second playback capability.

B. Controller
1. The display's controller shall be able to run independently from a controlling computing device allowing the display to operate even when the controlling device is unhooked or turned off.
2. Communication protocol shall support other matrix products from the vendor such as other outdoor or indoor displays of varying sizes and/or colors.
3. Each controller shall be connected to a light sensor allowing each LED display to automatically adjust brightness according to display direction and lighting conditions.
4. The controller shall allow connection to a temperature sensor that provides accurate site temperatures.
5. Active presentations, stored presentations, schedules, display configuration, time and date shall be stored in non-volatile memory. No external power or battery backup will be required to maintain this data.

C. Control and Communications
1. The display controller should be DHCP-enabled and allow for static IP addressing.
2. Each single face display shall be controller and monitored by its own embedded LED controller. Each 2V display shall be controlled and monitored by one sign controller in the primary face, and the secondary face must show the same mirrored content.
3. The LED controller shall be able to receive instructions from and provide information by accessing the Venus Control Suite using the following communication modes:

- Ethernet Cat6 Wire.

2.5 CONTROL SOFTWARE

A. Control Software: Display content and scheduling shall be via Venus Control Suite (VCS) cloud-based solution. Software to be hosted on manufacturer's servers at no cost to the customer. Web browser access to the solution to support iOS Safari, Android Chrome, Internet Explorer v11+, Microsoft Edge, Google Chrome and Mozilla Firefox.

B. Basic content creation to be performed via browser-based online editor.

C. Expanded content creation tools available via PC-compatible Content Studio download.

D. Supports import of images (PNG, BMP, GIF, JPG, PSD) and video files (AVI, MPG, MP4, MOV) in both browser-based and downloadable content utilities.

2.6 VINYL WRAP

A. The vinyl wrap for the existing structure will be designed using the City of Coquitlam's attached documents: Parks Wayfinding Design Standards (CEDMS 3156569) (1) and Coquitlam Graphic Standards - 2020 Update (1). All designs must be submitted to the Owner for approval prior to installation.

B. The vinyl wrap must be durable, weatherproof, and scratch-resistant. It must be premium vinyl, with waterproof adhesive.

PART 3 - EXECUTION

3.1 GENERAL

A. The Poirier Sports and Leisure Complex will be open as determined by the Owner. Work by the Contractor outside of these hours is subject to approval by the Owner.

B. The Contractor must coordinate all work with other trades and coordinate with the Owner regarding the location of all equipment and junction box locations for equipment, control, and power cables/conduits from terminals, and stub-ups to system equipment racks.

C. The Contractor must verify and provide the final engineering for the existing sign to ensure that it can accommodate the dimensions and weight of the new LED Display.

D. The Contractor must obtain all required permits and licenses.

E. All design and engineering must be reviewed by the Owner prior to any work being undertaken by the Contractor.

F. Installation will include the delivery, unloading, mounting to structure, interconnecting LEDSYS wiring and components, equipment placement and adjustment, and all other work regardless of whether it is expressly detailed which is necessary to provide complete and operational systems.

G. The Contractor must inspect all equipment for damage and accuracy prior to installation at the project site.

H. For the purposes of coordination with Owner specified furniture, the Contractor will ensure that all equipment and mounting hardware is compatible with the furniture. It will be the Contractor's responsibility to ensure that sizes and supports are adequate for the LEDSYS equipment installation.

I. During the installation, and up to the date of issuance of final acceptance, the Contractor will be under obligation to protect their finished and unfinished work against damage and loss. In the event of such damage or loss, they will replace or repair such work at no cost to the Owner.

3.2 QUALITY ASSURANCE:

A. All work is to be performed in accordance with Article 1.05 – REFERENCES.

3.3 SITE CONDITIONS

A. The Contractor must be aware of the existing site conditions and accept them as is.

B. The Contractor must deliver all equipment to the site and convey to appropriate locations within the site as directed by the Owner.

3.4 DELIVERY, STORAGE, AND HANDLING

A. Coordinate shipping and receiving with the Owner.

B. Manpower and equipment (forklifts, etc.) must be pre-arranged to accept the product shipments at the Contractor’s expense.

C. Limited storage is available.
   1. Contractor may be responsible for obtaining off-site storage. Cost of off-site storage and transportation to and from the site is the responsibility of the Contractor.
   2. Contractor must ensure all equipment is always secured and protected from ambient conditions.
   3. Equipment must only be delivered to the site when it is ready to be installed.

D. Provide details to the receiver of any special handling requirements or if the shipment might be hazardous.

E. Ship product in its original container to prevent damage or contamination.

F. Ship and handle packages in accordance with manufacturers' recommendations.

G. Provide protective coverings during construction, to prevent damage or contamination.

H. If a product is damaged during shipping, handling, while in storage, or during construction, it is replaced at no cost to the Owner.

I. Dispose of all packaging according to site requirements including separating recycling from garbage.

3.5 STRUCTURAL NOTES

A. The Contractor must submit all drawings, calculations, and inspection reports stamped by a professional structural engineer who is licensed/registered in the province of British Columbia.

B. Site-specific considerations, local best practices, local and national building code, environmental considerations and all authorities listed in Article 1.6 REFERENCES should be observed for all structural engineering.

C. The Contractor is responsible for confirming all engineering calculations, base building information, and site conditions obtained by the Contractor or provided by the Owner.

D. All installed structures require inspection by the Contractor's structural engineer. Proof of inspection must be provided to the Owner, and all deficiencies must be corrected and re-inspected. The cost of all inspections is the responsibility of the Contractor.

E. Bolted and/or field welded connections must be inspected by the Contractor's structural engineer to ensure that they meet the minimum requirements of the engineered structural drawings, the governing building code, and industry best practices. Prior to painting or concealing the connection, the Contractor must provide the engineers stamped report to the Owner. The cost of these inspections is the responsibility of the Contractor.

F. All materials used in this project must be new, unused, and of the latest design. Refurbished and obsolete materials are not permitted.

G. The Contractor will observe industry best practices and provide separation when connecting dissimilar metals.

H. All welders must be certified, and certificates must be on-site and available for inspection as requested.

I. All hot work must follow the Owner's hot work permit process.

J. All components must be finished for standard exterior service and are warranted to be free of rust or other defects for a period of ten (10) years.

K. Mounting Hardware exposed to the weather is aluminum, brass epoxy painted galvanized steel, or stainless steel. Apply corrosion inhibitor to all threaded fittings.

3.6 ELECTRICAL AND DATA NOTES

A. The Contractor must submit all drawings, calculations, and inspection reports stamped by a professional electrical engineer who is licensed/registered in the province of British Columbia.

B. Site-specific considerations, local best practices, environmental considerations, and all authorities listed in Article 1.6 REFERENCES should be observed for all electrical engineering.

C. The Contractor is responsible for confirming all engineering calculations, base building information, and site conditions obtained by the Contractor or provided by the Owner.

D. All work detailed on the Contractors' secondary power electrical drawings requires inspection by the Contractor's or Owner's electrical engineer or representative and the local inspection agency. Proof of inspection must be provided to the Owner, and all deficiencies must be corrected and re-inspected. The cost of all inspections is the responsibility of the Contractor.

E. Any additional raceway (conduit, cable tray, J hooks) required to provide a complete system for both power and signal/data is furnished and installed by Contractor. Any additional raceway required will have the routing of the raceway approved by Owner prior to installation.

F. The Contractor is responsible for the final connection of power and data to all components. All secondary electrical panels, disconnects, junction boxes, and outlets must be clearly labeled. Ensure all branch power circuits are labeled at the component/receptacle and at the corresponding service panel.

G. Power demarcation is in the main electrical room in the building. The Contractor is responsible for the installation of new wire in the existing conduit to the new marquee LED and a new load center in the new marquee LED.

H. The Contractor is responsible for ensuring all equipment and parts has been certified as required by national, provincial, and local electrical code. Any equipment not certified as required in Article 1.6 REFERENCES. will require on-site certification by a listed testing agency. All cost associated with obtaining on-site certification is the responsibility of the Contractor. Written proof of certification or equivalent will be required prior to any work being performed on site.

I. The Contractor will provide all fiber transmitters and receivers and include amplifiers where required.

J. The Contractor is responsible for terminating and performing final connection of all cables.

3.7 CABLE INSTALLATION

A. Cable must be installed according to "Standard Integration Practices", adhering to the standards set out in Article 1.6 REFERENCES, and in a manner to adhere to manufacturer's specifications for maximum cable pulling tension, minimum bend radius, and rigging calculations and restrictions.

B. Installing and terminating data cabling requires a high level of craftsmanship. Pulling, routing, cutting, dressing, bundling, terminating, and labeling the cable should only be done by qualified individuals.

C. The Contractor will directly supervise its sub-contractors responsible for pulling cable through tray or conduit. Once the cable is pulled to its final location, only qualified Wiremen will be allowed to handle it.

D. At no point should the cable be stepped upon or driven over.

E. Provide appropriate support at all horizontal-to-vertical transitions to keep the weight of the cable from degrading at the point of transition.

F. Provide splice free wiring and cabling from origination to destination, free from joints, connections, or splices.

G. Any cables, conductors, wires, or their respective insulating jackets that have been nicked or cut, pinched, or otherwise damaged will be rejected and replaced by the Contractor without cost to the Owner.

H. Isolate cables and wires of different signals or different levels; and separate, organize, and route to restrict channel crosstalk or feedback.

I. Cable color coding is not required. However, if a color is chosen for a particular system it must be unique to that system and remain constant and cannot be changed to another cable color.

J. Cover edges of cable and wire pass-through holes in chassis, housings, boxes, etc., with rubber grommets or Brady GRNY nylon grommetting.

3.8 AESTHETIC NOTES

A. Fully label the LEDSYS, including all components and parts. Also, label all storage areas and/or cabinets used for spare parts and the system manuals. All labels will be 1/8” engraved, block lettering on self-adhesive labels unless otherwise directed by the Owner. Printed labels on equipment will not be accepted. Ensure that all labels match the contract closeout documents.

B. All flashing, trims, covers, panels, etc. are the responsibility of the Contractor to design, supply and install. No bolts, unfinished edges, Secondary Steel, equipment sides and rear, or any other raw element is permitted to be within public view for any part of the LEDSYS.

C. All metal materials must be finished (primed and coated or other approved finish). This includes but is not limited to flashing, decking, primary, and secondary steel. Graphics for vinyl wrapping will be provided to the Contractor by the Owner.

D. The minimum standard for products and finishes is as follows: Contractor is responsible for ensuring that the material thickness provided is sufficient to prevent warping or “oil canning” on the span or sections of material installed.

1. Metals: + 19ga/1mm aluminum on internal baffling, + 12ga/2mm aluminum on flashing, + 11ga/3mm aluminum on any routed or primary surface, + 12ga/2.6mm stainless steel (visible).
2. Plastics: + 3mm thickness on thermoformed polycarbonates, + 7ga/4.5mm thickness on flat polycarbonates, + 11ga/3mm thickness on flat acrylics.
3. Finishes: + Approved Automotive Grade Enamels, +ASTM D3451-06 compliant Powder Coating.
4. Vinyl Films: + 3M, Avery, Oracal, or other as approved, + 9oz weight for any outdoor banner (UV coated).

E. The Contractor will ensure that all material thickness prevent warping or buckling on surfaces throughout the LEDSYS.

F. The Contractor, its subcontractors, suppliers, and vendors must not display trademarks, logos, or branding on any part of the LEDSYS that is within public view without written permission from the Owner.

3.9 INSTALLER TESTS AND ADJUSTMENTS

A. The following must be verified before the commencement of all tests and adjustments.
1. AC powered devices are properly grounded.
2. AC powered devices are connected to their assigned circuits, and the hot, neutral, and ground conductors are connected correctly.
3. Heat shrink or neoprene cable (Hellerman) sleeves are installed on all sheathing breakouts.
4. All exposed bare wire is covered with insulating tubing.
5. Correct and consistent polarity is observed in all terminations.
6. Cable is dressed, routed, and labeled in a neat and consistent manner.
7. Adequate service loops are left on all cables where appropriate.
8. Solder joints and their surroundings are cleaned and free of flux and dust.
9. All wire fragments, cable remnants, dust, and debris are removed from the site and properly disposed of.

B. Certification of Cabling and Equipment after Termination
1. All UTP cabling is tested for proper T568A termination using the appropriate tester.
2. Any UTP cabling intended for data connectivity use must be fully certified to TIA/EIA-568-C Category 5e specifications with a cable analyzer.
3. Ensure all fiber optic cabling meets appropriate TIA/EIA-568-C standards with an optical loss test set.
4. Record the test results of each fiber strand and present this information using Fluke LinkWare software or similar.
5. Ensure all fiber optic strands are within their respective optical loss budget.
6. Using an OTDR, determine the source of any light losses that exceed the calculated loss budget for the fiber under test. Replace or repair the faulty item.
7. Calibrate, optimize, and align all devices for proper operation. Use test patterns and test tones to align audio DAs, mixer gain stages, device inputs, and outputs.
8. Commission each cable to ensure a proper end to end connectivity.

9. Ensure all computer network paths, shared folders, shared storage, and resources are accessible and functioning.

3.10 MANUFACTURER COMMISSIONING AND TESTING

A. On-site Manufacturer commissioning and testing is to be completed with the assistance of the Contractor. Members of the Contractor's workforce must be available for the date and duration of this process.

B. Commissioning of LED displays is to include all required adjustments and on-site calibration necessary for pixels, blocks, seams, and other components to adhere to Article 2.2.

C. Testing should include the operation of each individual system, including backups, control system functionality, integration, power cycles, and diagnostic capabilities. Verify all LED screen firmware, brightness, color temperature, uniformity of viewing angle, refresh rates, pixel to pixel variation, block to block variation, and all other tests required to ensure that all components adhere to this Specification.

D. The Manufacturer/Contractor is required to provide all equipment necessary for testing of the LEDSYS.

E. The Manufacturer/Contractor will document all factory and on-site testing, calibration, corrections, and repairs. Documentation will include but is not limited to:
   1. Performance date of the given procedure.
   2. Condition of the performance of the procedure.
   3. Type of procedure and description.
   4. Parameters measured and their values.
   5. Values before and after calibration and repairs as required.
   6. The names of personnel conducting the procedure.
   7. The equipment used to conduct the procedure.

3.11 ACCEPTANCE

A. Upon receipt of notice of substantial completion by the Consultant, the Owner and Contractor will schedule the testing of all systems and components that form the LEDSYS.

B. After the results of the testing have been verified by the Consultant, and all deficiency have been rectified by the Contractor, the Contractor will demonstrate the operation of the LEDSYS in full, and verify that all parts of the LEDSYS meet the requirements of this Specification.

C. Upon completion of initial testing and all subsequent testing, the Contractor will provide written reports of all test, and all other documents and drawings as required by this Specification.

D. The LEDSYS will not be considered accepted until all testing and demonstrations are complete, and the required reports have been signed off by the Owner.

E. The Contractor will give evidence that all parts of the LEDSYS meet this Specification in its entirety.

F. The Contractor is responsible for making any necessary modifications or repairs to ensure that the LEDSYS meets this Specification.

G. The Owner is not responsible for any costs associated with any unsuccessful acceptance tests.

H. The Owner, at its sole discretion, may engage an independent testing agency to verify the display's specifications, at any time during the specified period of time. Cost for this testing will be borne by the Owner if the display complies. If the testing exhibits the display in noncompliance with the specifications, the cost of the testing will be the responsibility of the Contractor. Contractor will also be responsible for making or replacing the components necessary to meet the specifications. The Owner will not be responsible for any added costs as a result of an unsuccessful test.

I. Upon completion of all testing, the Contractor will provide the spare parts inventory as required in Section 2.

J. All manuals, spare parts, and portable equipment will be stored and secured by the Contractor as directed by the Owner.

K. Prior to issuance of final acceptance, the LEDSYS must operate without fault for a minimum of seven consecutive days.

3.12 INSTRUCTION OF OWNER PERSONNEL

A. As a condition of Substantial Completion and a minimum of fifteen days prior to any facility events, the Contractor at its own expense must have completed end-user training. The training must cover the operation, maintenance, troubleshooting and care of the system in full and according to the manufacturers' recommendations.

B. Operation training will include standard operations of all systems; as well as start-up and shut-down procedures, use of all backup systems, and shut down procedures during a power failure.

END OF SPECIFICATION