THE CITY OF EDMONTON
DESIGN-BUILD AGREEMENT
CAPITAL LINE SOUTH LRT EXTENSION PHASE 1

Schedule 5 – D&C Performance Requirements

Part 1: General

[NTD: Schedule 5 D & C Performance Requirements – all parts – will be amended July 30, 2024 to reflect requirements associated with Appendix A - Affordability Opportunities Amendment Term Sheet]

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PART 1: GENERAL

SECTION 1-1 – DESCRIPTION OF INFRASTRUCTURE

1-1.1 PROJECT DESCRIPTION

A. The Design-Builder must design and construct the Project to be a high floor, urban style, light rail transit system, extending approximately 4.5 km from the current terminus south of the Century Park LRT Station, located on 111 Street north of 23 Avenue NW, to north of Ellerslie Road west of 127 Street SW, adjacent to the Heritage Valley Transit Centre.

B. When completed, the Infrastructure must provide a fully accessible, safe, efficient, environmentally sustainable, and convenient transportation option for the residents of and visitors to Edmonton.

C. The Design-Builder must design the Infrastructure to be sustainable and fully integrated with the surrounding urban environment. The philosophy of Sustainable Urban Integration underpins and reinforces the concept that the Infrastructure supports an integrated approach to urban and sustainable Design and Construction, while recognizing the importance and value of creating vital, diverse, and pedestrian friendly environments with a strong sense of place.

D. The Design-Builder must integrate the Infrastructure with the Capital Line LRT to provide seamless interfaces and interoperation with the Capital Line LRT.

1-1.2 MAJOR INFRASTRUCTURE COMPONENTS

1-1.2.1 Infrastructure Alignment and Design Constraints

A. The Project connects to the Capital Line LRT at Century Park Station.

B. The Project includes At-Grade, above-grade, and below-grade sections of Trackway.

C. The following Infrastructure elements must be as shown in Figures 5-1A-01 to 5-1A-08 of Appendix 5-1A [*Project Description Drawings*] to this Schedule:

1. the location and alignment of the Mainline Track within the LRT Corridor, including the number of tracks, the alignment of Trackway, and the locations of track crossovers;

2. the location of each Station and the Llew Lawrence OMF defined in Section 1-1.2.2 [*Stations and Facilities*] of this Schedule;

3. the location of each key Transportation Structure defined in Section 1-1.2.3 [*Key Transportation Structures*] of this Schedule;

4. the Roadway, SUP and sidewalk layout, including:

    a. number and configuration of traffic lanes;

    b. general alignment of all SUPs and sidewalks;

    c. bay lengths for turning lanes;

    d. dedicated lanes for turning movements at intersections;

    e. the general location of each pedestrian crosswalk;

    f. the general location of each bus stop, bus bay and lay-by bay;

g. the general location of all dedicated and shared use parking for paratransit, Kiss and Ride, and maintenance vehicles.

5. the general location of Amenity Nodes.

D. In the event of any conflict, ambiguity, or inconsistency between or among the requirements of Section 1-1.2.1.C [*Infrastructure Alignment and Design Constraints*] and any other provision of this Schedule, the requirements of such other provisions prevail.

1-1.2.2 Stations and Facilities

A. The Infrastructure includes Stations as set out in Table 1-1.2.2.1 [*Stations*]:

Table 1-1.2.2.1: Stations

Item	Location
Twin Brooks Station	An At-Grade station on the west side of 111 Street NW north of 9 Avenue NW
Heritage Valley North Station	An At-Grade station located on the west side of the Heritage Valley Transit Centre, north of Ellerslie Road SW between 127 Street SW and Heritage Valley Trail

B. The Infrastructure includes the Llew Lawrence OMF located north of the Heritage Valley Park and Ride lot, and southeast of the AHD and Heritage Valley Trail northbound to eastbound ramp.

1-1.2.3 Key Transportation Structures

A. The Infrastructure includes the following key Transportation Structures:

1. An underpass at 23 Avenue NW along 111 Street NW.

2. A three-span bridge over Blackmud Creek for LRT and active mode use located on the west side of 111 Street NW.

3. Addition of a southbound traffic lane to the existing 111 Street roadway bridge over Blackmud Creek by removal of the SUP on the existing bridge.

4. A two-span network arch LRT bridge across AHD, located between 111 Street NW and 127 Street SW.

1-1.2.4 Systems

A. The Design-Builder must design and construct, except as per Section 1-1.3 [*City Works*], the following key systems that will form part of and will be integrated into the Capital Line LRT to monitor and control the operation of the Infrastructure in accordance with Part 6 [*Systems*] of this Schedule:

1. a Train Control System with a fully bi-directional fixed block signal system;

2. a GCWS;

3. an automatic routing system;

4. a CCTV system with full security and operational Closed Circuit Television surveillance of Stations, LRVs, Utility Complexes, and the Llew Lawrence OMF;

5. radio systems based on distributed antenna systems ensuring AFRRCS coverage along the LRT ROW and Llew Lawrence OMF site. It provides the radio network for first responders, and the voice radio system supporting operations and maintenance staff;

6. telephones with landline voice communications for operational purposes, and for the convenience and safety of passengers;

7. Industrial Control System and Traction Power SCADA systems to centrally monitor, control, and respond to building and traction power infrastructure, respectively;

8. a Network Management System to centrally monitor networked devices; and

9. Public Address systems and Variable Message Signs with automated Train arrival announcements and centrally controlled Passenger announcements.

B. The Infrastructure must include a Traction Power System to generate and deliver LRV propulsion energy including:

1. Mainline Traction Power Substations in Utility Complexes, and one standalone TPSS, along the LRT Corridor and located within the Llew Lawrence OMF, to generate the power supply for operation of the Infrastructure.

2. An OCS along the LRT Corridor and within the Llew Lawrence OMF, to distribute the Traction Power supply and deliver propulsion energy to the LRVs.

C. The Infrastructure Design must interface with City supplied Traffic Signal equipment and Traffic Control Devices along the LRT Corridor to safely and efficiently manage the interaction between modes of transportation at all At-Grade crossings and at the following signalized intersections which do not intersect the Trackway and do not require LRT pre-emption:

1. 111 Street / 23 Avenue NW; and

2. 111 Street / William Lutsky Family YMCA Access.

1-1.3 CITY WORKS

A. The Design-Builder must provide the City with written notification at least 90 days in advance of completing the “Design-Builder Antecedent Works” outlined in Table 1-1.3.1 [*City Works*].

B. Promptly following completion of all the “Design-Builder Antecedent Works” as set out in Table 1-1.3.1 [*City Works*], the Design-Builder must provide the City with written notice and unimpeded and uninterrupted access to the relevant Infrastructure specified in Table 1-1.3.1 [*City Works*] to permit the City to perform the works listed under the heading “City Work Activity” (the “**City Works**”) as required in the Integration Management process defined in Section 5.6 [*Integration Management*] of Schedule 4 [*Design and Construction Protocols*].

C. Where Testing and Commissioning is part of City Works the City will complete activities per the Testing and Commissioning Register including providing relevant test reports in accordance with Section 2.9.3 [*Test Reports*] of Schedule 6 [*Testing and Commissioning*] in the Design-Builder’s recording system described in 2.9.3(b) of Schedule 6 [*Testing and Commissioning*].

D. All City Works noted in Table 1-1.3.1 [*City Works*] require integration with the Project Work. The Design-Builder must use commercially reasonable efforts to provide the integration assistance as necessary to complete the Project Work.

E. The Construction Schedule shall include all "Design-Builder Antecedent Works", each "City Works Period", and any relevant Design-Builder integration activities required to complete the Project Work, for each of the City Works described in Table 1-1.3.1 [*City Works*].

F. The Design-Builder is responsible for developing a staging schedule for the City Works, which must be Submitted and Accepted by the City in accordance with Schedule 2 [S*ubmittal Review Proedure*].

G. If the Design-Builder makes changes to an accepted Antecedent Works (i.e. Final Design) that impacts the design, equipment, install, or commissioning of a City Works item including pre-work that the City has undertaken related to any City Works item, the City shall identify the impacts of such a change to the Design-Builder and be compensated with commercially and technically appropriate cost, schedule relief that puts the City in no better no worse position than if the change to Final Design did not occur.

H. The parties acknowledge that the applicable "City Works Period" set out in Table 1-1.3.1 shall commence on the date that is the later of:

1. completion of the "Design-Builder Antecedent Works" set out in Table 1-1.3.1; and

2. 90 days from the written notification provided by the Design-Builder pursuant to subsection A above.

Table 1-1.3.1: City Works

City Works Table			
City Works Activity		**City Works Period**	**Design-Builder Antecedent Works**
1	Complete ETS Network design and configure Network Equipment.	17 months	Accepted Final CTS Design in accordance with Section 6-4 [*Communications*].
2	Install fully tested network equipment and communications rack in the communications rooms. Complete fibre optic and copper wiring downstream of the demarcation point. Following completion of antecedent work, the Design-Builder will have restricted access to this Infrastructure, and may only have access with permission and escort from the City.	2 months	Install and test communication power system in accordance with Section 2.3.1 [*Communications Power System*] of Appendix 6E [*Communications Design Preliminary Report*] to the communications rooms and test fibre network connectivity. Complete fibre optic and copper wiring termination to demarcation point in cross connect rack in accordance with Section 2.3.3.2 [*Utility Complex Communication Room*] of Appendix 6E [*Communications Design Preliminary Report*].
3	Install the station controller units in the UC communications rooms, complete all necessary cabling. Tie in to existing ETS backbone fibre prior to final integration of CLSE to existing ETS Network. Complete Testing and Commissioning and integration of ETS Network.	6 months	Free-issue station controller units supporting the PA/VMS system to the City for installation in the UC communications rooms as per Section 2.10 [*Public Address & Variable Message Signs*] of Appendix 6E [*Communications Design Preliminary Report*]. Complete fibre testing to patch panel at Century Park Station communications room as per Section 6-

City Works Table			
City Works Activity		**City Works Period**	**Design-Builder Antecedent Works**
			4.1.2.F [*CTS Conceptual Overview*].
4	Complete coverage survey and design radio (AFRRCS) coverage.	3 months	Complete first Interim Design of LRT ROW and Llew Lawrence OMF in accordance with Part 4 [*Transportation Structures and Building Structures*] and Part 7 [*Operations and Maintenance Facility*].
5	Supply and install radio cabinet within the communication bungalow at 23 Avenue Underpass. Complete integration Testing and Commissioning of radio network.	6 months	Complete Construction of communication bungalow, conduits and cables to demarcation point in accordance with Section 2.12 [*Tunnel Radio - Alberta First Responders Radio Communications System*] of Appendix 6E [*Communications Design Preliminary Report*].
6	Free issue fully tested ETS Network equipment to be installed in signals and Traction Power rooms within bungalows and UCs.	1 week	Install and test power supply to the signal bungalows and Traction Power and signals rooms within UCs and the TPSS in accordance with Section 2.3.1 [*Communication Power System*] of Appendix 6E [*Communications Design Preliminary Report*].
7	Complete the Wi-Fi heat map and the final location of the WAP devices.	2 months	Accepted Final Design building layout floorplans (UC & TPSS, stations and OMF building) in accordance with Part 5 [*Facilities*].
8	Complete Corporate IT Network design and configure network equipment. Free issue WAP devices.	16 months	Accepted Final CTS Design in accordance with Section 6-4 [*Communications*].
9	Supply and install fully tested network equipment (PDU, switches and routers). Activate City fibre to Corporate IT Network racks and complete end device integration Testing and Commissioning.	6 months	Design and provide City IT racks and cable infrastructure in accordance with Section 2.5 [*City Corporate IT Network*] of Appendix 6E [*Communications Design Preliminary Report*]. Successfully test City fibre in accordance with Section 2.5 [*City Corporate IT Network*] of Appendix 6E [*Communications Design Preliminary Report*].
10	Complete ICS configuration and integration Testing and Commissioning	6 months	Design and Construction of ICS systems as per Section 2.8 [*Industrial Control System (ICS)*] of Appendix 6E [*Communications Design Preliminary Report*].

City Works Table			
City Works Activity		**City Works Period**	**Design-Builder Antecedent Works**
11	Complete video management system configuration design.	6 months	Accepted Final CTS Design in accordance with Section 6-4 [*Communications*] of Part 6 [*Systems*].
12	Complete video management system integration Testing and Commissioning to accept new CCTV data.	8 months	Supply and Install CCTV cameras and dry contact alarms points connected to the ICS in accordance with Section 2.7 [*Closed Circuit Television*] of Appendix 6E [*Communications Design Preliminary Report*].
13	Procure telephone licenses for all phones and the staff service phones for installation by the Design-Builder.	1 month	Final Design of telephony system in accordance with Section 2.11 [*Telephony*] of Appendix 6E [*Communications Design Preliminary Report*].
14	Complete telephony system integration and configuration	4 months	Complete telephony system installation in accordance with Section 2.11 [*Telephony*] of Appendix 6E [*Communications Design Preliminary Report*].
15	Complete SmartFare network design and configure SmartFare equipment.	18 months	Accepted Final CTS Design in accordance with Section 6-4 [*Communications*] of Part 6 [*Systems*].
16	Supply and install fully tested SFVMs and SFVs. Complete integration Testing and Commissioning of SFVMs and SFVs.	4 months	Design locations, reserve space for, and provide anchors in accordance with Sections 5-3.7.4.2 [*Smart Fare Vending Machines*] and 5-3.7.4.3 [*Smart Fare Validators*] of Part 5 [*Facilities*]. Provide CTS fibre optic cabling and all associated Smart Fare Vending Machine infrastructure, including power, in accordance with Section 2.13 [*Smart Fare Network*] of Appendix 6E [*Communications Design Preliminary Report*].
17	Procure City TV screens and corporate advertising screens.	14 months	Accepted Final CTS Design in accordance with Section 6-4 [*Communications*].
18	Install City TV screens.	2 months	Reserve space for and provide anchors in accordance with Section 5-3.7.4.5 [*City TV Screens*] of Part 5 [*Facilities*]. Provide CTS fibre optic cabling and all associated City TV screens infrastructure in accordance with Section 2.14 [*Third Party Advertising*] of Appendix 6E [*Communications Design Preliminary Report*].

City Works Table			
City Works Activity		**City Works Period**	**Design-Builder Antecedent Works**
19	Install corporate advertising screens.	2 months	Reserve space for and provide anchors in accordance with Section 5-3.7.4.6 [*Corporate Advertising Screens]* of Part 5 [*Facilities*]. Provide CTS fibre optic cabling and all associated corporate advertising screen infrastructure in accordance with Section 2.14 [*Third Party Advertising*] of Appendix 6E [*Communications Design Preliminary Report*].
20	Configure and complete integration Testing and Commissioning of the City C-Cure card access system.	6 months	Install and connect all card readers to the C-cure panel. Provide and test the data cables from C-cure panel to interface directly with the City's C-Cure card access system and the end devices in accordance with Section 2.6 [*C-Cure Access Card*] of Appendix 6E [*Communications Design Preliminary Report*].
21	Design of all Traffic Signal assets.	14 months	Accepted roadway and Track geometric Final Design in accordance with Section 3-2 [*Roadways/Sidewalks/Shared Use Paths*] and Section 3-1 [*Track*] of Part 3 [*Civil*].
22	Construction of all Traffic Signal assets. Complete traffic controller programming, traffic cabinet interface panels, signal timings and coordination with LRT signalling.	8 months	Provide Roadway surface, curb construction, and civil works for cabinet placement and pole bases in accordance with Section 3-2 [*Roadway/Sidewalks/Shared Use Paths*]. Provide, make application for and coordinate energization of unmetered EPCOR power feeds to all Traffic Signal assets in accordance with Section 3-5 [*LRT Corridor Utilities*]. Provide conduit and Corporate IT Network fibre cable from signal bungalows to traffic cabinets designated by the City for connection to the applicable Traffic Signal controller in accordance with Section 3-2.4.3 [*Area Specific Requirements*] and Section 6-3.1.3.8 [*At-Grade Crossings*] and conduit from Traffic Signal controller to traffic signal poles.
23	Supply and install bus stop furniture.	90 days	Provide amenity pads in accordance with Section 3-2.3.5 [*Bus Stops*].

City Works Table			
City Works Activity		**City Works Period**	**Design-Builder Antecedent Works**
24	Supply and install "regulatory", "traffic control" and "information" Roadway signage and supports.	60 days	All related roadway surfaces, curb lines and drainage work completed. All related Roadway signage design including location and content accepted in accordance with Section 3-2.3.7 [*Signing, Delineation and Pavement Markings*].
25	Supply and install all permanent Roadway, pedestrian and bicycle pavement markings.	90 days	Provide all related Roadway or SUP surfaces completed and Accepted lane painting Final Design accepted in accordance with Section 3-2.3.7 [*Signing, Delineation and Pavement Markings*].
26	Root prune or branch prune trees as required to accommodate Construction activities or to mitigate damage to Protected Trees during Construction.	Duration dependant on number of Protected Trees requiring pruning	Identify tree roots or tree branches that will require pruning to accommodate Construction activities and access or damaged during Construction in Accordance with Section 2-12 [*Tree Retention, Removal and Protection/ Preservation*].
27	Perform tree damage correction measures and post Construction care if damage to a Protected is equal to or greater than 30% of the entire tree, including tree trunk, tree canopy and root system.	Duration dependant on number of Protected Tree	Evaluate the damage in accordance with Section 2-12 [*Tree Retention, Removal and Protection/Preservation*].
28	Public Art artist stakeholder engagement and concept development activities as described in Section 2-5.E.	Varies See Section 2-5 [*Public Art*]	Provide Public Art Lead, Public Art Integration Schedule and participate in the Public Art process in accordance with Section 2-5 [*Public Art*].
29	Design, supply, install and remove temporary traffic signals.	2 months	Traffic Accommodation Request in accordance with Section 1-5.2.6 [*Traffic Accommodation Request (TAR)*] and an Accepted Traffic Accommodation Plan in accordance with Section 1-5.2.7 [*Traffic Accommodation Plan (TAP)*].

1-1.4 INTEGRATION WITH CAPITAL LINE LRT

1-1.4.1 Integration Responsibilities

A. The Design-Builder is responsible for the integration of all components that make up the Project, except as per Section 1-1.3 [*City Works*], with the corresponding components of the Capital Line LRT such that the expanded Capital Line LRT running from Clareview Station in the northeast to Heritage Valley North Station in the south will be a completely integrated and fully functioning system.

B. All integration activities impacting existing LRT operations must have prior Acceptance from the City via an Operations Restrictions Request form, included as Disclosed Data.

1-1.4.2 Schedule and Coordination of Integration Points

A. The Design-Builder must coordinate and schedule integration of the Construction with the Capital Line LRT with the City. Six closures in total of the Century Park Station and adjacent tracks will be permitted for the Design-Builder to carry out all required Construction works and integration activities, provided that the Design-Builder provides the City with 180 days prior written notice of the planned commencement of these closures, at which time the Design-Builder must also submit a work plan for the Construction, integration, and commissioning activities including any safe operating restrictions and operating restrictions. These closures must be on Non-Business Days and will therefore be a maximum of 2 days in length unless a closure occurs on a weekend with a statutory holiday.

B. The City will provide the Design-Builder access to the Capital Line LRT for up to a maximum of one 14 consecutive day period to carry out any non-intrusive, visual surveys, provided that:

1. The Design-Builder submits a survey schedule and plan that details locations and number of the Design-Builder representatives 90 days prior to commencement of the proposed access period.

2. Access along the Capital Line LRT is limited to the following locations:

    a. DL MacDonald LRT OMF;

    b. Century Park Utility Complex;

    c. LRT Operations Control Centre;

    d. Century Park LRT Station non-public spaces;

    e. one traffic controller cabinet along the Capital Line LRT;

    f. one communications/signal vault along the Capital Line LRT; and

    g. one additional utility complex along the Capital Line LRT.

3. The Design-Builder may request additional access to perform further non-intrusive, visual surveys of the Capital Line LRT, beyond the 14-day period allotted, with approval being subject to mutual agreement between the City and the Design-Builder.

C. All activities defined in Section 1-1.4.2 [*Schedule and Coordination of Integration Points*] of this Schedule are included in the Capital Line LRT Integration Schedule in accordance with Schedule 3 [*Construction Schedule*].

1-1.4.3 Specific Integration Activities

A. Without limiting the generality of Section 1-1.4.1 [*Integration Responsibilities*], the Design-Builder is responsible for all integration activities necessary to ensure a fully integrated Capital Line LRT operation from Clareview Station to Heritage Valley North Station.

1-1.4.4 City Responsibilities

A. The City will reasonably coordinate with the Design-Builder, to minimize disruption to the performance of the Project Work and to the operations of Capital Line LRT through the operations restriction process.

1-1.5 INTERPRETATION

A. This Schedule is written as an output specification and defines what the Design-Builder must achieve in the Design and Construction. This Schedule and its Appendices include both mandatory requirements and non-mandatory recommendations. For the purposes of this Schedule and its Appendices only, the following terminology applies:

1. Must: Denotes a mandatory requirement.

2. Should: Denotes a recommended, but non-mandatory requirement.

3. May: Denotes an optional requirement.

B. Where “cost effective”, “appropriate”, “sufficient”, “minimize”, “safe”, “robust”, “accurate”, “efficient”, “reliable” and related and similar terms are used, they are to be construed and interpreted in terms of whether they are cost effective, appropriate, sufficient, minimizing, safe, robust, accurate, efficient, reliable, etc. from the perspective of a prudent public owner of a light rail transit system who balances capital costs against maintenance, operations, efficiency and other non-capital costs over the life of the system.

C. Unless explicitly stated otherwise, wherever the term “existing” is used in this Agreement, it will be understood to mean existing as of the Effective Date.

1-1.6 DESIGN AND CONSTRUCTION

1-1.6.1 Design and Construction Requirements are Complementary

A. The Design and Construction Requirements are intended to be complementary and interpreted to avoid conflict, with words and phrases interpreted in a manner consistent with Good Industry Practice.

1-1.6.2 Equivalents and Substitutes

A. Any proposed deviation from, or substitute to, the requirements of this Schedule 5 [*D&C Performance Requirements*] must be submitted to the City by the Design-Builder as an Innovation Proposal, pursuant to Schedule 13 [*Changes*].

1-1.6.3 Infrastructure to be New

A. All Infrastructure must be new unless the Design and Construction Requirements expressly specify otherwise.

1-1.6.4 Sustainability General Requirements

1-1.6.4.1 General

A. The Design-Builder must implement strategies for sustainable Design and Construction to meet the requirements of all relevant codes, policies, procedures, and guidelines cited in this Schedule 5 [*D&C Performance Requirements*], including requirements to:

1. minimize noise, vibration, odor, and exhaust;

2. minimize the heat island effect on sun-exposed areas;

3. minimize the energy consumption of the Infrastructure;

4. maximize the use of materials with low embodied carbon; and

5. maximize the use of bio-based products, excluding animal skin, when selecting materials for permanently installed products.

1-1.6.4.2 ENVISION®

A. Using the self-assessment tool offered by the Institute for Sustainable Infrastructure based on Version 3 of the sustainable infrastructure framework ENVISION®, submit a report at each anniversary of the Effective Date, starting with the first anniversary, and a final report at Construction Completion, under the lead of and authenticated by a certified Envision Sustainability Professional retained by the Design-Builder, with experience coordinating a minimum of two projects having achieved at least an ENVISION® verification award level of "Verified". Each report must include:

   1. the most likely number of points that can be achieved for each of the 64 credits (for the purpose of this Section these points are called "achievable points");

   2. documentation demonstrating how the achievable points were determined; and

   3. a summary of the achievable points achieved at the time of submitting the report, and a proposal for additional measures that could be implemented to achieve at least 35% of the total applicable ENVISION® points, if this percentage is not already achieved, as a mandatory requirement.

1-1.6.4.3 Building Structures Specific Requirements

A. The Design-Builder must comply with the requirements specific to Heritage Valley North Station in accordance with Section 5-2.1.1 [*Sustainable Buildings Policy, Codes and Ratings Systems*] of this Schedule.

B. The Design-Builder must comply with the requirements specific to the Llew Lawrence OMF in accordance with Part 7 [*Operations and Maintenance Facility*] of this Schedule.

1-1.6.4.4 Lighting and Energy Efficiency

A. The Design-Builder must incorporate the use of daylighting control strategies to the facility lighting design in accordance with the HFDG and Edmonton Facility Consultant Manual.

B. The Design-Builder must provide high-efficiency lighting products in all fixtures in accordance with the HFDG and Edmonton Facility Consultant Manual.

C. The Design-Builder must minimize total lumen output projected on adjacent properties or natural areas in accordance with Section 3-4 [*Street Lighting*] of this Schedule.

1-1.6.4.5 Materials

A. The Design-Builder must submit a Sustainable Procurement Policy Report at each anniversary of the Effective Date, starting with the first anniversary.

B. Following the requirements set out by the ENVISION® framework, credit RA1.1 "Support Sustainable Procurement Practices" to achieve at least an "Improved" level, as verified by a certified Envision Sustainability Professional retained by the Design-Builder, with experience coordinating a minimum of two projects having achieved at least an ENVISION® verification award level of "Verified".

C. The Design-Builder must comply with the durable building requirements in accordance with Section 5-3.11.1.1 [*Durability*] of this Schedule.

D. The use of the following materials and chemicals is prohibited:

   1. cadmium: with the exception of batteries;

2. lead: with the exception of batteries;

3. mercury;

4. phthalates;

5. wood treatments containing creosote, arsenic or pentachlorophenol; and

6. except where required by this Agreement or otherwise not practicable, any by-product that causes eutrophication, acidification, and de-oxygenation of waterways during the manufacturing process or at the end-of-life disposal.

1-1.6.4.6 Construction

A. The Design-Builder must comply with the City's *Community Standards Bylaw*, 14600 and Vehicle Idle Control Directive A1447 in accordance with Section 3 [*City of Edmonton Environmental Requirements*] of Schedule 10 [*Environmental Performance Requirements*].

B. Handling of all waste associated with Construction and Deconstruction Work or other demolition, removal, relocation, abandonment or rehabilitation forming part of the Project Work must be in accordance with Section 1-7.2 [*Material Storage, Handling, and Disposal*] of this Schedule.

C. All Construction and demolition waste must be recycled in accordance with Section 15 [*Contamination, Hazardous Substances and Waste*] of Schedule 10 [*Environmental Performance Requirements*].

D. The Design-Builder must implement an indoor air quality management plan during Construction that:

1. complies with or exceeds LEED Indoor Air Quality requirements and SMACNA Indoor Air Quality Guidelines for Occupied Buildings under Construction;

2. protects all materials from moisture damage;

3. includes the use of a MERV 8 filter when operating any permanent air handling equipment during Construction, such that:

   a. filters are installed at each return air grille and return or transfer duct inlet opening;

   b. all filters are replaced immediately before the Construction Completion Date; and

   c. does not permit smoking within the Building Structure site construction fence limits during Construction.

SECTION 1-2 – REFERENCE DOCUMENTS

1-2.1 APPLICATION OF THE REFERENCE DESIGN

A. The Reference Design included as Disclosed Data was prepared by the City to verify the Project requirements and objectives can be met within the Lands, to support public consultation to date, and to support development of the Project's technical requirements.

B. The Reference Design was prepared based on City requirements and the codes, standards, policies, and guidelines in force at the time of preparation, many of which have been updated since the Reference Design was completed. The Design-Builder must perform the Project Work in accordance with any codes, standards, policies, and guidelines in effect at the time of Financial Bid Response Deadline. Any use by the Design-Builder of any or all aspects of the Reference Design in performing the Project Work is entirely at the Design-Builder's risk.

1-2.2 CODES AND STANDARDS

A. Unless expressly stated otherwise, each reference in this Schedule 5 [*D&C Performance Requirements*] to a code, standard, specification, published data, practice or guideline of a standards organization means the latest version of that code, standard, specification, data, practice, or guideline in effect at the time of Financial Bid Response Deadline.

B. The HFDG is the primary reference for the Project, which the Design must comply with.

1. The HFDG includes a variance request process to allow for variances for specific requirements. The Design-Builder may pursue variances from the HFDG requirements per the variance request process identified within the HFDG. Any variance requests must be submitted as a Design Development Change in accordance with Section 5 [*Modifications to Processes and Procedures*] of Schedule 13 [*Changes*].

2. In the event of any ambiguity, conflict, or inconsistency in the provisions between the HFDG and this Agreement, the provisions within this Agreement shall take precedence.

C. Without limiting any obligations of the Design-Builder in this Agreement, the Design-Builder must perform the Design and Construction in compliance with all applicable codes, standards, specifications, published data, practices, and guidelines specified in this Agreement or otherwise required by Good Industry Practice, including:

1. City of Edmonton Design & Construction Standards (Volumes 1 to 8). Available on the City's website.

2. City of Edmonton Facility Design & Construction Consultant Manual – Volume 1 Design Process Guidelines, 2022-11-21 and Volume 2 Technical Guidelines, 2021-09-10. Available on the City's website.

3. City of Edmonton Commissioning Consultant Manual – Volume 1 Whole Building Commissioning Process and Guidelines, 2018-11-30 and Volume 2 Building Envelope Commissioning Process and Guidelines, 2019-03-22. Available on the City's website.

4. City of Edmonton LRT Standard Record Documents Guidelines. Available as Disclosed Data.

5. Edmonton High Floor LRT Signal Engineering Manual. Available as Disclosed Data.

6. Edmonton High Floor LRT Best Common Practice documents. Available as Disclosed Data.

7. NFPA 130

8. National Building Code of Canada – 2019 Alberta Edition (NBCAE)
9. Canadian Electrical Code
10. Safety Codes Act
11. TAC Geometric Design Guide for Canadian Roads
12. CSA S6 Canadian Highway Bridge Design Code (S6)
13. City's *Accessibility for People with Disabilities Policy* (C602)
14. City's *Light Efficient Community Policy* (C576)
15. City's *Public Art to Enhance Edmonton's Public Realm* (C458D)
16. City of Edmonton Manual of Temporary Traffic Control – 2021 Edition, 2021-03-26. Available on the City's website.
17. City's *Public Engagement Policy* (C593A)
18. Alberta Occupational Health and Safety Code
19. City's *Community Standards Bylaw*,14600
20. City's *Zoning Bylaw*, 12800
21. City's *Edmonton Design Committee Bylaw*, 14054
22. City's *Urban Traffic Noise Policy* (C506A)
23. Alberta Safety Codes Council Barrier-Free Design Guide
24. City of Edmonton Access Design Guide, 2021-11-29. Available on the City's website.
25. CSA B651 Accessibility Design for the Built Environment
26. EPCOR Customer Connection Guide
27. Technical Guideline for the Interconnection of Distributed Energy Resources to EPCOR Distribution and Transmission Inc.'s Distribution System
28. City of Edmonton Administrative Policy & Procedures A1407B - Provision of Office Space and Special Purpose Accommodation for Civic Staff
29. City of Edmonton Administrative Directive A1472 - Accessibility for People with Disabilities
30. ASME A17.1/CSA B44 - Handbook on Safety Code for Elevators and Escalators
31. Standard for Installation of Fire Alarm Systems CAN/ULC-S524
32. Standard for Verification of Fire Alarm Systems CAN/ULC-S537
33. Illuminating Engineering Society of North America (IES)
34. National Energy Code of Canada for Buildings (NECB)

D. In the case of any conflict, ambiguity or inconsistency between or among any codes, standards, specifications, published data practices and guidelines, specified in this Agreement or otherwise required for compliance with Good Industry Practice, unless specifically stated otherwise, the provisions establishing the higher quality, manner or method of performing the Design and Construction, using the more stringent standards, must prevail, with the intent that the provisions which produce the highest level of safety, reliability, durability, performance, quality and service govern.

1-2.3 APPROVED PRODUCTS

A. Included as Appendix 5-1D [*Approved Products List*] of this Schedule is the Approved Products List that the Design-Builder must use in the Design and Construction of the Infrastructure.

SECTION 1-3 – DESIGN GUIDANCE/REQUIREMENTS

1-3.1 GENERAL DESIGN PARAMETERS

1-3.1.1 Design Features

A. The Infrastructure must incorporate the following:

1. Accessibility: All routinely serviced subsystems and components must be readily accessible for service and inspection. Accessibility of components will be proportional to the expected frequency of maintenance and repair. No active electrical or mechanical components that can foreseeably require maintenance may be structurally embedded to preclude convenient access for repair or replacement. The Design-Builder must ensure that any maintenance activities required on Wayside Equipment does not create LRT operational constraints, nor encroach onto the road carriageway or any pedestrian/cyclist facilities.

2. Modular Design: Modular design principles must be employed to the greatest extent practicable. Components must be packaged together in replaceable subassemblies according to the logical function that they perform. Components or subassemblies requiring occasional removal should be plug-in units.

3. Interchangeability: Assemblies or components that are functionally interchangeable must be physically interchangeable. Assemblies or components that are not functionally interchangeable must not be physically interchangeable.

4. Adjustability: The need for adjustments must be avoided where possible. Where adjustment points cannot be avoided, they must be readily accessible, adequately identified, and self-locking to prevent inadvertent adjustment or drift.

5. Need for Special Tools: Equipment which will require special tools for maintenance and repair must be avoided. If special tools are unavoidable, then the Design-Builder must define the requirement for the special tools and the Design-Builder and the City will collaborate to determine the quantity of such special tools required. The Design-Builder must supply such special tools at no cost to the City.

6. Panels and Openings: Panels and openings must be of sufficient quantity, size, and placement to permit ready access from normal work areas and positions without adversely impacting LRT operations. Adjustment controls and fittings must be directly accessible through panels and openings. Self-retaining fasteners must be used wherever possible. Special access opening tools must not be used unless considered necessary to prevent vandalism.

7. Cable Connections: Cable connectors must be spaced far enough apart so that they can be grasped firmly for connecting and disconnecting. Connectors must be properly labeled and keyed so that they cannot be interchanged or improperly installed. Signal and power pins must not be adjacent.

8. Lifting Assists: Handles, lifting lugs, or functional equivalents on components weighing 18 kg or more must be provided.

9. Visual Inspection: Visual inspection of Equipment and Structures, if required, must be possible without removal of permanent or fixed elements.

10. Test Points: Built-in test points must be provided and marked. Major components having test panels or test points must be located for easy accessibility and must permit external monitoring of critical functions. Test points must be protected against environmental damage and human error.

11. Fault Isolation: Failure indicators must be provided and identified. Systematic fault isolation procedures must be developed and included in the maintenance manuals.

12. Labeling: All test points, fault indicators, modules, wire junctions, pipes, tubes, wires, etc., must be identified by name plates, colour coding, number coding, or other means to assist maintenance personnel. All ROMs, PROMs, and EPROMs must be labeled with the version and date of stored software.

13. Hardware: Standard, commercially available industrial components and hardware must be used wherever possible.

14. Vandalism: Vandal and damage resistant materials must be used whenever possible in accordance with HFDG, Edmonton Facility Consultant Manual, D&CS and any other relevant documents listed in Section 1-2.2.C [*Codes and Standards*] of this Schedule.

1-3.1.2 Operations and Maintenance Compliance

A. The Design-Builder must comply with the requirements presented in the High Floor Operations and Maintenance Parameters document included as Appendix 5-1B [*High Floor Operations and Maintenance Parameters*].

B. Prior to initiating construction of the trackway and LRT systems, the Design-Builder must submit and receive Acceptance of a run time analysis report demonstrating their Design meets the maximum one-way 6.0 minute total LRV run time requirement from Century Park Station to Heritage Valley North Station in both the southbound and northbound directions, in accordance with Section 4.2 [*Run Times*] of Appendix 5-1B [*High Floor Operations and Maintenance Parameters*], including the 20 second dwell time requirement at Twin Brooks Station.

1-3.1.3 Edmonton Climatic Requirements

A. The Infrastructure, including all systems and subsystems, must be designed for, and provide full functionality during operation in all environmental conditions present in Edmonton as described in the HFDG.

1-3.2 PROPERTY FENCES

1-3.2.1 Fences Temporarily Removed for Construction

A. Where any existing Property Fence is removed by the Design-Builder, the Design-Builder must:

1. immediately provide temporary fencing to secure the property during Construction;

2. complete the Construction of the replacement Property Fence within 45 days of the initial removal of the existing Property Fence; and

3. construct the replacement Property Fence to match the existing adjacent Property Fence (e.g., dimensions, construction type, layout, material, colour, etc.).

1-3.2.2 Temporary Fences

A. Where temporary fencing is provided in accordance with Section 1-3.2 [*Property Fences*] of this Schedule, it must:

1. provide an equivalent level of security at all times for the affected property as was provided with the Property Fence that was removed; and

2. comply with the requirements of Section 1-8.3 [*Temporary Barriers and Enclosures*] of this Schedule.

B. Provide temporary fencing along any vacant lots adjacent to the Construction.

1-3.3 DESIGN AND SERVICE LIFE

A. The Design Life and Service Life requirements for various elements of the Infrastructure are provided in the HFDG.

1-3.4 SPECIAL DESIGN OBLIGATIONS

1-3.4.1 Geotechnical and Environmental

A. The City has undertaken a limited geotechnical investigation along the Project alignment, including the Llew Lawrence OMF site. The results of that investigation are available as Disclosed Data. The Design-Builder must undertake a detailed geotechnical investigation to characterize the subsurface soil and groundwater conditions. The design of the Infrastructure must be based on the findings of the Design-Builder's geotechnical investigation and must include settlement control measures to ensure the integrity and serviceability of the completed Infrastructure over the service life of each Infrastructure element.

1-3.4.2 AltaLink Transmission Powerlines in the TUC

A. The final Design must meet requirements for clearances and other criteria determined by AltaLink, as per Section 1-4.1.3 [*AltaLink Transmission Powerlines in the TUC*] of this Schedule, and as per Schedule 28, Part 2 [*Utility Matters*].

1-3.4.3 Interface with Capital Line LRT along 111 Street

A. A vault with associated duct banks exists south of the Century Park Station along the Trackway for the Design-Builder to complete Infrastructure tie-in to Capital Line LRT.

1-3.4.4 Anthony Henday Drive LRT Bridge

A. The Design-Builder must satisfy Alberta Transportation's and the City's requirements for Design and Construction of the Anthony Henday Drive LRT Bridge.

B. The Anthony Henday Drive LRT Bridge preliminary design has been developed in collaboration with Alberta Transportation and has specific design attributes that the City is obligated to adhere to. The Design-Builder must comply with the requirements stipulated in Part 4 [*Transportation Structures and Building Structures*] of this Schedule 5 [*D&C Performance Requirements*] and the AHD License Agreement available as Disclosed Data.

1-3.4.5 Interface with Heritage Valley Transit Centre

A. A communications vault exists at the Heritage Valley Transit Centre that must be used to connect and integrate with the Infrastructure. Design and Construction of this connection must be undertaken by the Design-Builder. As-built information for this vault has been provided as Disclosed Data.

1-3.4.6 Noise Studies

A. The City has undertaken a noise study based on the Reference Design, as described in Section 14.5 of the HFDG and in accordance with the UTNP, which is provided as Disclosed Data and indicates the Reference Design does not exceed the UTNP threshold and therefore does not require noise mitigation.

B. The Design-Builder is not required to perform a supplementary noise study unless their track Design varies from the Reference Design by more than 1.0 m in horizontal alignment or 250 mm in vertical profile for the portion of the Trackway between Century Park Station and the north TUC limit.

C. Any additional or upgraded noise mitigation measures that are required based on a supplementary noise study are the responsibility of the Design-Builder.

1-3.5 SURVEY

1-3.5.1 Coordinate System

A. The survey control coordinate system must be in Universal Transverse Mercator and the control station coordinate values must be delivered in NAD83 - 3TM referenced to the 114 meridian as well as in NAD 83 CSRS format.

B. Any Design prepared in ground coordinates must be converted from ground to grid coordinates for the Record Drawing submission, and ground to grid coordinate conversion factor(s) must be submitted to the City as part of the Design Data.

1-3.5.2 Control Monuments

A. The Design-Builder must establish Project survey control using City's coordinate system for the Design and Construction and do checks as required to confirm the control system's accuracy. An appropriate number of control points along the alignment to maintain accuracy must be used.

1-3.5.3 Alberta Survey Control Markers

A. The Design-Builder must protect all existing permanent ASCM.

B. ASCM must not be removed, altered or destroyed except to the extent that they are in direct conflict with the Infrastructure. Where an ASCM is required to be removed, altered or destroyed the following process must be followed:

1. provide the City a minimum of 30 days notice in advance of when an ASCM needs to be removed;

2. replace any ASCM that must be removed in accordance with drawing 6600 of the City of Edmonton Design and Construction Standards prior to Service Commencement;

3. install any new ASCM as close as practicable to the ASCM that was removed with the final decision on location made jointly between the City and the Design-Builder; and

4. coordinate with the City to complete a final survey on the new ASCM to integrate it into the Provincial spatial infrastructure.

1-3.5.4 Horizontal Control

A. The Design-Builder must use the Project survey control coordinate system as the basis for all Project Work.

B. The Project survey control coordinate system must have a second order standard of accuracy.

C. All surveys made for the Construction of the Infrastructure must be adjusted by holding the monuments fixed.

D. The Design-Builder must provide a minimum of one survey control per area, defined as Level 1 of the Work Breakdown Structure.

1-3.5.5 Vertical Control

A. Vertical control must be based on the Canadian Geodetic Vertical Datum of 2013 (CGVD2013).

1-3.6 ENVIRONMENTAL CORROSION

A. The Design-Builder must determine all environmental corrosion conditions and ensure all material selections, designs, and coatings used to protect metallic structures are suitable to meet the required Design and Service Life in accordance with the HFDG.

SECTION 1-4 – CONSTRUCTION REQUIREMENTS

1-4.1 CONSTRUCTION CONSTRAINTS

A. This Section 1-4 sets out specific Construction constraints. These constraints are in addition to other constraints set out in this Schedule and are not intended to be exhaustive.

1-4.1.1 Coordination and Access

A. The Design-Builder must maintain continuous, safe, and effective access for pedestrians, cyclists, and motor vehicles to all properties including businesses, residential homes, and institutions.

B. Where existing access is Barrier-Free, Barrier-Free access using existing or alternate routes must be maintained.

1-4.1.2 Heritage Valley Transit Centre and Park and Ride

A. All-directional movements at the Ellerslie Road SW / 127 Street SW / Heritage Valley Transit Centre and Park and Ride site access intersections must be maintained during Construction.

B. Closures of the existing accesses to the Heritage Valley Transit Centre and Park and Ride facility from Ellerslie Road SW and 127 Street SW are not permitted.

C. The existing Heritage Valley Transit Centre and Park and Ride facility must remain operational during Construction with a minimum of 800 functional parking stalls required at all times.

D. The Design-Builder must maintain public access to the existing Park and Ride facility throughout Construction, including a minimum of one clear, direct path of travel for pedestrians between the Heritage Valley Transit Centre and existing park and ride facilities.

E. Any site clearing and preparation work within the Heritage Valley Site (including the SWMF and Llew Lawrence OMF), including the use or removal of any existing stockpiles, is the responsibility of the Design-Builder. Soils requiring removal must be handled in accordance with Schedule 10 [*Environmental Performance Requirements*]. Stockpile analysis results and an approximate stockpile location plan can be found as Disclosed Data.

F. Construction access to the Heritage Valley Park and Ride facility must be through the site access intersection only.

1-4.1.3 AltaLink Transmission Powerlines in the TUC

A. The Design-Builder must:

1. adhere to AltaLink limits of approach for temporary and permanent installations, people or equipment in relation to the overhead transmission power lines within the TUC;

2. coordinate Design with AltaLink as described in Schedule 28, Part 2 [*Utility Matters*] for acceptance; and

3. confirm Construction limitations around AltaLink facilities in advance of any Construction activities being performed.

1-4.1.4 Construction around the William Lutsky Family YMCA / Kinsmen Arena

A. The Design-Builder must maintain full all-directional vehicular access to the William Lutsky Family YMCA and the Kinsmen Arena at all times from 111 Street NW.

B. The Design-Builder must maintain internal traffic circulation and access to William Lutsky Family YMCA and the Kinsmen Arena at all times.

1-4.1.5 Construction Around All Commercial Properties

A. Vehicular access to all commercial properties within and/or adjacent to the Construction area must be maintained at all times that businesses are operating or may expect deliveries.

B. Barrier-Free access to and from all commercial properties within and/or adjacent to the Construction area must be maintained at all times.

C. Crosswalk access at two adjacent intersections must not be simultaneously closed. The Design-Builder must provide a minimum of 14 days notice to the City in advance of changes to crosswalk access. Crosswalks in-service must be marked, visible, illuminated, free of debris, and safely accessible.

1-4.1.6 Construction Around All Residential Neighbourhoods

A. In accordance with Section 1-5.2.2.1.H [*City Right-of-Way Requirements*], a minimum of one vehicular access must be maintained at all times to the Twin Brooks neighbourhood and any other residential neighbourhoods adjacent to the Construction.

B. Notification to residents and proper information and signage must be in place 2 weeks prior to initiating any Construction activities.

1-4.1.7 SUP Crossing and Connection to Blackmud Creek

A. The existing 111 Street Roadway Bridge over Blackmud Creek includes a SUP. Design-Builder must always maintain a fully accessible and barrier-free SUP connection across the Blackmud Creek River Valley during Construction. Provided that the SUP connection into the Blackmud Creek River Valley on the east side of 111 Street NW is maintained, the west SUP connection is not required during Construction. Temporary paved connections may be used during Construction to maintain public accessibility, subject to the Design-Builder requesting and the City's prior Acceptance.

B. All detouring during Construction must comply with Section 1-5.3 [*SUP Access Across and To Blackmud Creek River Valley*] of this Schedule.

1-4.1.8 Monitoring Wells in the Lands

A. If the Design-Builder encounters any monitoring wells in the Lands during Construction:

1. if completion of Construction requires excavation to the full depth of the well, the Design-Builder may remove the well during excavation for Construction; or

2. if completion of Construction does not require excavation to the full depth of the well, the Design-Builder must seal the monitoring well by filling the PVC pipe with time released coated bentonite pellets. The top of the well must then be cut to a minimum depth of 0.6 m below the excavation design grade and the sub-cut at the well location backfilled with compacted clay fill.

1-4.1.9 Bats Observed in Blackmud Creek River Valley

A. The Design-Builder must carry out all Construction activities in Blackmud Creek River Valley in accordance with Section 16.2 [*Restricted Activities for Bat Mitigation Measures*] of Schedule 10 [*Environmental Performance Requirements*].

1-4.2 PIPELINE AND POWERLINE CORRIDORS

A. Pipeline corridors cross the Lands at the following locations:

1. The TUC

2. Along the north side of Ellerslie Road

B. Powerline corridors cross the Lands at the following locations:

1. The TUC

C. All Construction activities within the vicinity of pipeline and powerline corridors must comply with Schedule 28 [*Project Approvals and Utility Matters*].

1. All Construction activities within pipeline corridors must adhere to the pipeline agreements and all field directions given by an authorized Pipeline Company representative.

D. The general location of pipeline and powerline corridors are shown in Appendix 5-1A [*Project Description Drawings*] and additional details are included as Disclosed Data.

1-4.3 CONSTRUCTION NOISE

A. The Design-Builder must comply with the noise control requirements in the City's *Community Standards Bylaw*, 14600 and the City's *Urban Traffic Noise Policy* (C506A).

B. The Design-Builder must notify the City of any noise disturbances in accordance with Section 3.2 [*Design and Construction Communications Services*] of Schedule 12 [*Communications and Engagement*].

C. Noise complaints from the public will require an immediate response from the Design-Builder, as directed by the City.

1-4.4 CONSTRUCTION VIBRATION CONTROL

A. Construction must not cause or permit damage to be caused to any buildings, structures or Utilities, whether by vibration or otherwise. Without limiting the preceding sentence, during Construction, vibrations must be limited to the following levels measured at the foundations or in the ground (between grade and foundation level) adjacent to any building:

1. 12.7 mm/s PPV at any facility with reinforced concrete, steel, or timber (no plaster) construction (e.g., industrial buildings, bridges, masts, concrete retaining walls and unburied pipelines):

   a. These facilities will be classified as "Building Category 3" for NPE purposes when monitoring vibration levels during the Construction Period.

2. 7.6 mm/s PPV at any facility with non-reinforced concrete and masonry (no plaster) construction (e.g., non-reinforced concrete and masonry buildings, masonry retaining walls and buried pipelines):

   a. These facilities will be classified as "Building Category 2" for NPE purposes when monitoring vibration levels during the Construction Period.

3. 5 mm/s PPV at any facility with non-engineered timber or masonry construction (e.g., typical timber-frame home):

a. These facilities will be classified as “Building Category 2” for NPE purposes when monitoring vibration levels during the Construction Period.

4. 3 mm/s PPV at any facility that is extremely susceptible to vibration damage (e.g., historic structures, churches):

a. These facilities will be classified as “Building Category 1” for NPE purposes when monitoring vibration levels during the Construction Period.

B. The Design-Builder must notify the City of any vibration disturbances in accordance with Section 3.2 [*Design and Construction Communications Services*] of Schedule 12 [*Communications and Engagement*].

C. Vibration complaints from the public will require an immediate response from the Design-Builder, as directed by the City.

1-4.5 MAINTENANCE DURING CONSTRUCTION

A. The Design-Builder must provide Notice to the City at least 10 Business Days prior to commencing Project Work at any portion of the City right-of-way, from one property line to the opposite property line (the “Occupied Right of Way”), indicating the boundaries of the Site, including a drawing, the relevant Work Package(s), and the planned beginning occupancy date/time, (the “Notice of Occupancy”). For any Sites within an Occupied Right of Way that the Design-Builder anticipates completing Construction before the Construction Completion Date to allow for the City to provide (1) snow and ice clearing on Roadways, bridge decks, sidewalks, and Shared Use Path, (2) grass cutting, (3) tree pruning of trees existing prior to occupancy or (4) shrub maintenance of shrubs existing prior to occupancy, the Notice of Occupancy shall outline those Sites which the Design-Builder will vacate prior to the Construction Completion Date. The Design-Builder will provide the City with notice at least 20 Business Days in advance of the date that the Design-Builder intends to vacate as well as an additional notice indicating when the Design-Builder has vacated within 10 Business Days of vacating the Site.

B. For all Sites, the Design-Builder must carry out Construction Maintenance beginning from the Notice of Occupancy (or beginning from the date that access to those Lands is granted) and ending on the earlier of the:

1. Construction Completion Date, and

2. the date on which the Design-Builder has vacated the Site of an Occupied Right of Way provided that it has provided the notices as outlined in Section A, above, and only as it relates to (1) snow and ice clearing (2) grass cutting, (3) tree pruning of trees existing prior to occupancy, and (4) shrub maintenance of shrubs existing prior to occupancy, as applicable.

C. The Design-Builder must maintain the Sites, as delineated in Section 1-4.5.B [*Maintenance During Construction*] of this Schedule, during the Construction Period, (the “Construction Maintenance”), to:

1. minimize impact of Construction to the public;

2. promote public safety by maintaining temporary lighting in accordance with TAC Guide for Design of Roadway Lighting and the D&CS;

3. adhere to Site Specific Security Plans;

4. maintain cleanliness pursuant to Section 1-8.4 [*Project Cleanliness*] of this Schedule;

5. perform snow and ice control of Roadways, sidewalks and SUPs within each Site in accordance with the City’s *Snow and Ice Control Policy* (C409K) and the *Community Standards Bylaw*,

14600, and prevent and remove ice build-up on Transportation Structures, until the Project Work is complete, and the Notice of Occupancy is withdrawn;

6. inspect the relevant Lands within 24 hours of receiving a complaint from the public or from the City relating to a pothole, and repair all identified potholes within 2 days of inspecting the relevant Lands;

7. maintain sidewalks and SUPs to safeguard pedestrian or cyclist accessibility;

8. maintain an accessible, hard surfaced travel path to all bus stops, whether permanent or temporary, including ice, snow and mud control;

9. protect trees in accordance with Section 2-12 [*Tree Retention, Removal and Protection/Preservation*] of this Schedule, notifying the public of tree removals or pruning on private property and notifying the City for tree removals or pruning on City Lands in accordance with Section 3.2 [*Design and Construction Communications Services*] of Schedule 12 [*Communications and Engagement*];

10. comply with the environmental requirements pursuant to Schedule 10 [*Environmental Performance Requirements*]; and

11. perform Custodial Maintenance of applicable Infrastructure elements prior to Construction Completion including:

    a. Maintenance of City installed equipment;

    b. Grass cutting, tree pruning and shrub bed maintenance in accordance with the Landscape Inspector Handbook, provided as Disclosed Data;

    c. General project cleanliness in accordance with Section 1-8.4.1 including street sweeping and debris removal on roadways, bridge decks, sidewalks, shared use paths, and bus stop pads, in accordance with the OSCAM Permit and the City of Edmonton's Manual of Temporary Traffic Control, provided as Disclosed Data;

    d. Snow and ice clearing on Roadways and bridge decks, sidewalks, Shared Use Paths, and bus stop pads in accordance with Section 1-8.4.1.D;

    e. Emptying of waste receptacles; and

    f. Vandalism repair and graffiti removal.

D. The Design-Builder must prepare and submit a Construction Maintenance Program in accordance with Section 7.2.3 [*Construction Maintenance Program*] of Schedule 4 [*Design and Construction Protocols*].

SECTION 1-5 – TRANSPORTATION MANAGEMENT

1-5.1 TRANSPORTATION MANAGEMENT COORDINATION

A. The Design-Builder must coordinate Transportation Management with the City in accordance with the procedures set out in this Section 1-5 [*Transportation Management*].

B. The Design-Builder must prepare and submit a Transportation Management Plan in accordance with Section 7.4 [*Transportation Management Plan*] of Schedule 4 [*Design and Construction Protocols*].

C. The Design-Builder must obtain all necessary OSCAM permits for all Construction that impacts Roadways, sidewalks, SUPs or bus stops (temporary or permanent). The OSCAM permits must be based on the Accepted Transportation Management Plan and will geographically align with the proposed staging and timing of the Construction.

D. For each site where the Construction impacts any Roadway, sidewalk, SUP or bus stop (temporary or permanent) the Design-Builder must:

1. prepare and submit to the City a TAR in accordance with Section 1-5.2.6 [*Traffic Accommodation Request (TAR)*] of this Schedule;

2. for work within the City Lands but outside of the TUC, prepare and include a TAP with each TAR, prepared in accordance with Section 1-5.2.7 [*Traffic Accommodation Plan (TAP)*] of this Schedule;

3. for work within the TUC; prepare and include a TAS with each TAR, prepared in accordance with Section 1-5.2.8 [*Traffic Accommodation Strategy (TAS)*] of this Schedule;

4. for each Roadway identified as being a transit route in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*] or acting as a temporary transit route detour during Construction, provide Transit Notification in accordance with the minimum notice periods as set out in Section 1-5.2.10 [*Transit Notification Period*] of this Schedule;

5. arrange bi-weekly site walks with the City to review bus stops, traffic and pedestrian accommodations throughout the site, at locations identified jointly by the City and the Design-Builder;

6. for each category of Roadway closure, provide public notification in accordance with the minimum notice periods as set out in Section 1-5.2.11 [*City Review and Public Notification Period*] of this Schedule; and

7. prior to working in the TUC, ensure all required permitting from Alberta Infrastructure and Alberta Transportation is in place in accordance with Schedule 28, Part 1 [*Project Approvals*].

1-5.2 TRANSPORTATION MANAGEMENT REQUIREMENTS

1-5.2.1 General

A. Without limiting Section 1-2 [*Reference Documents*] of this Schedule and except as otherwise specified herein, Transportation Management must comply with all applicable laws, codes, standards and regulations, including:

1. City of Edmonton Manual of Temporary Traffic Control – 2021 Edition, 2021-03-26. Available on the City's website

2. Alberta Transportation - Traffic Accommodation in Work Zones

3. City of Edmonton Design and Construction Standards

4. TAC Geometric Design Guide for Canadian Roads

5. TAC Bikeway Traffic Control Guidelines for Canada

B. Where an existing Roadway, sidewalk, or SUP route cannot be safely provided through a Site, an alternative route acceptable to the City must be made available prior to and throughout the duration of the impacted period.

C. Where a route is provided through a Site, the Design-Builder must provide safety measures that ensure the safety of all Site users including vehicles, bicycle traffic, pedestrians, workers and equipment.

D. Where access to existing sidewalks, SUPs, or crosswalks are closed or restricted due to Construction, the Design-Builder must install and maintain Barrier-Free, temporary, all weather reasonable alternative routes for pedestrian and bicycle traffic.

E. The Design-Builder must install temporary random rapid flashing beacon pedestrian crossing flashers to support pedestrian crosswalks and bus stop connections where sightlines are restricted due to Construction activities and hoarding, or complex traffic accommodation laning exists, including lane reductions, lane expansions, chicanes and/or any other temporary laning configuration that increases driver workload and where existing pedestrian traffic controls have been removed due to Construction activities.

F. Light towers for nighttime work must be positioned to not distract or create a visual impairment for oncoming traffic or cause light to spill into adjacent residences and other adjacent properties.

G. All Roadways constructed as detours and open to traffic must have an asphalt surface.

H. The Design-Builder must provide a temporary bus stop in a location as directed by the City to replace each permanent bus stop affected by Construction as follows:

1. Provide a hard surface at temporary bus stops to maintain accessibility. Hard surfaces must have an even, non-slip surface that is suitable for wheeled mobility devices in all weather conditions and may consist of asphalt, concrete, wood or any type of comparable hard surface with non-slip overlay. Typical design standards for sidewalk crossfall must be maintained at all hard surfaced temporary stops. Compacted and maintained 20 mm crushed aggregate may be accepted for short-term (3 days or fewer) temporary surfaces at bus stop areas.

2. Maintain Barrier-Free accessibility of pedestrian connections to temporary and permanent bus stops. Connections must have a hard, slip-resistant surface with ramps, where needed, to transition between curbed walks and roadways. When along a roadway, delineate paths connecting to bus stops with, at a minimum, bollards with blue ribbon strung between as well as wayfinding signage to direct patrons to the stop.

3. Where raised curb is not provided at a temporary bus stop:

    a. Provide a blue coloured barrier of similar specification to the Alberta Transportation TL-4 Single Slope Concrete Barrier to assist with wayfinding at the head of the temporary stop, with the downward nose pointing in the direction of bus travel and the vertical straight face aligned with the bus front door. Install a bus stop sign provided by the City on top of the blue barrier with the sign mounted a minimum of 2.1 m above the ground and pointed inward over the bus stop waiting area so it does not overhang into the adjacent lane.

b. Provide concrete barriers to delineate the roadway from the temporary bus stop. Arrange the barriers in the following configuration to provide spaces to accommodate boarding and alighting from all bus doors:

   i. blue barrier at head of bus stop;

   ii. 1.5 m gap for the front doors;

   iii. 3.0 m barrier;

   iv. 4.0 m gap for the rear doors;

   v. 3.0 m barrier;

   vi. 2.5 m space for the rear doors (articulated bus); and

   vii. resume barriers.

c. Provide temporary raised wooden ramp Construction or equivalent with non-slip top and accessible connection to the adjacent sidewalk, path or delineated pedestrian travel way.

4. Where a raised curb is provided and the pedestrian travel way (sidewalk or SUP) is wider than 1.5 m, provide a blue barrier at the head of the temporary stop and install a bus stop sign on the barrier. Where the pedestrian travel way is 1.5 m wide or less, install the bus stop sign either at the back-of-walk or directly affixed into concrete to not encroach on the accessible clear width.

5. Provide wayfinding to temporary bus stops from the existing permanent bus stop location, or from the connecting pedestrian walkway when Construction closures necessitate full removal of the road segment of the existing permanent bus stop. Wayfinding must be blue on white and incorporate the words ‘ETS Bus Stop’ with directional arrows for guidance. Signs must be placed in a clear line of sight from the closed stop at a minimum height of 1.2 m to the base of the sign. Signage must be a minimum of 60 cm by 60 cm with a minimum font size of 10 cm for informational text.

6. If a temporary bus stop is installed at a location where there is reduced or no roadway lighting, the Design-Builder must provide lighting so that Patrons travelling to/from or waiting at the bus stop are visible and safe. Lighting elements must not encroach on the accessible clear width along any sidewalks, SUPs or delineated travel path to/from a bus stop.

7. When an existing or temporary bus stop with a bench and/or waste receptacle is relocated, equivalent replacement amenities must be provided at the temporary bus stop replacing it, unless otherwise directed by the City. Waste receptacles at bus stops will be installed by the City and bus stop benches will be installed by the City’s advertising contractor. The Design-Builder must notify the City in writing, not less than 17 Business Days and not more than 25 Business Days prior to relocating a bus stop.

8. When an existing or temporary bus stop with a shelter is relocated due to Construction activities and the new temporary stop will be in use for a minimum of an entire winter or 9 months, the Design-Builder must provide a replacement shelter at the temporary bus stop replacing it, unless otherwise directed by the City. The Design-Builder must also supply and install a precast or cast-in-place concrete pad to support shelter anchoring in accordance with Standard Detail Drawings Section 4100 of the City of Edmonton Complete Streets Design and Construction Standards. No power supply is required for any replacement shelters.

9. The Design-Builder will not be responsible for the installation of a temporary bus stop where the City has directed that it is required outside of the City Lands.

10. The Design-Builder is responsible for communicating transportation management impacts, including lane, road, sidewalk, and alley closures, and trail and bike route disruptions for all transportation modes (including motorists, cyclists, and pedestrians) in accordance with Section 3.2 [*Design and Construction Communications Services*] of Schedule 12 [*Communications and Engagement*] and Section 1-5.2.11 [*City Review and Public Notification Period*] of this Schedule.

1-5.2.2 Roadway Restriction Construction Requirements

A. The Design-Builder is responsible for the costs of Roadway and Traffic Control Device modifications outside the City Lands to accommodate traffic detours and bus rerouting as identified in Accepted TARs.

B. All existing turning movements must be maintained at all signalized intersections during Peak Traffic hours except where it is unsafe to do so as confirmed through a Hazard Analysis or where they will be removed permanently, and in which case the TAP must include provisions for detours to compensate for the affected turn movements.

C. The Design-Builder must monitor and maintain all traffic accommodation for compliance with the Accepted Transportation Management Plan, TARs, TAPs, TASs and OSCAM permits using ACSA certified personnel with working knowledge of the City of Edmonton Procedures for On-Street Construction Safety and Alberta Transportation Traffic Accommodation in Work Zones.

D. Implementation of any closure without an Accepted TAR will be considered a Non-Performance Event as specified in Schedule 16 [*Payment Mechanism*].

1-5.2.2.1 City Right-of-Way Requirements

A. The minimum number of traffic lanes which must remain open on any Roadway within the City right-of-way are defined in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*]. In order to be considered open in accordance with this Section 1-5.2.2.1.A, a lane which is on a Roadway which:

1. Is not an existing transit route, as identified on Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*], must have a width of at least 3.35 m.

2. Is an existing transit route, as identified on Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*], must have an unobstructed envelope width of at least 3.5 m and be designed to accommodate all required bus turn movements and manoeuvres through swept path analysis.

B. All existing turning movements must be maintained at the 23 Avenue and 111 Street intersection at all times. Through the intersection, two lanes (through & right turn movements) as well as dedicated left turn bays will be maintained at all times in all directions.

C. 111 Street from south of 23 Avenue to the TUC, may be reduced to one lane each direction provided left turn bays are maintained at intersections during off peak hours. This closure may extend through Peak Traffic hours, subject to an Accepted TAR.

D. During Peak Traffic hours, no two adjacent signalized intersections may have their respective existing traffic capacity reduced by greater than 50% at the same time and in the same travel direction.

E. Where a signalized traffic intersection has a capacity reduction of greater than 50%, all adjacent traffic intersections must be operating at no less than 85% capacity during Peak Traffic hours.

F. For the purpose of this Section 1-5.2.2 [*Roadway Restriction Construction Requirements*], capacity percentages are based on the number of open traffic lanes prior to restrictions, relative to the number of open traffic lanes during the restrictions.

G. Closure of Roadways within the Lands will only be permitted if alternative routes are available on adjacent Roadways with the same or higher classifications as defined in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*].

H. Full intersection closures will not be permitted at the following intersections, except for overnight or weekend closures or limited time periods for specific Construction activities including, but not limited to girder erection and rail installation, subject to an Accepted TAR.

1. 111 Street NW at 19 Avenue NW / Saddleback Road

2. 111 Street NW at 12 Avenue NW

3. 111 Street NW at 9 Avenue NW

I. To maintain vehicular access to the Twin Brooks neighbourhood at all times, concurrent closures of the intersections of 111 Street at 12 Avenue NW and 111 Street at 9 Avenue NW are not permitted.

1-5.2.2.2 TUC Requirements

A. For Construction in the TUC, the Design-Builder must assume the roles of Contractor, Consultant, and Municipality as set out in Alberta Transportation Traffic Accommodation in Work Zones.

B. For any Construction impacting traffic in the TUC, the Design-Builder must submit a TAS in accordance with Section 1-5.2.8 [*Traffic Accommodation Strategy (TAS)*] and Section 1-5.2.11 [*City Review and Public Notification Period*] of this Schedule to the City.

C. During any Construction works in the TUC that involve any speed reductions or Lane Closures, the Design-Builder must provide continuous traffic monitoring along interchange ramps to ensure traffic queuing does not extend onto, and impact traffic on AHD.

D. Detour routes for Lane Closures within the TUC must be approved by the Province.

E. Lane Closures are permitted on roadways within the TUC as follows:

1. All through lanes on AHD will remain open at all times except:

   a. when a crossover detour is allowed to be in operation subject to an Accepted TAS; or

   b. during short duration, as defined in the Alberta Transportation Traffic Accommodation in Work Zones, off peak single Lane Closures subject to an Accepted TAS. Peak hours on AHD are defined as 06:00 – 09:00 and 15:00 – 18:00, Monday through Friday.

2. Interchange ramp closures are permitted in accordance with Section 1-5.2.5 [*Road Closure Restrictions*] and Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*] of this Schedule.

F. In order to be considered open in accordance with Section 1-5.2.2.2.D, a lane must have the applicable minimum width in accordance with Alberta Transportation Traffic Accommodation in Work Zones and not have a speed reduction below 80 km/h.

G. No access to Construction sites is permitted to/from AHD except for access to and from the median for pier Construction, which will be permitted subject to an Accepted TAS. No access to and from the

median will be permitted for any reason between 06:00 and 09:00, and between 15:00 and 18:00 on any day.

H. Crossover detours on AHD must:

1. be designed to operate at a minimum of 50 km/h;

2. be constructed with an asphalt pavement structure designed to withstand the expected traffic volumes and loads;

3. be installed according to the Accepted TAS;

4. maintain a minimum of three through lanes (minimum of one lane westbound and one lane eastbound) at all times; and

5. only operate between 22:00 and 06:00.

I. Maintain access to and within the TUC in accordance with all permits issued by Alberta Infrastructure and Alberta Transportation.

J. Temporary lane realignment is permitted on AHD provided:

1. the number of through traffic lanes on any Roadway are not to be reduced to less than the applicable "Minimum Lanes to Remain Open" as set out in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*];

2. areas of temporary widening are constructed with an asphalt pavement structure designed to withstand the expected traffic volumes and loads;

3. the realignment of the lanes does not require a speed reduction below 80 km/h;

4. existing pavement markings must be removed to the satisfaction of the City and Alberta Transportation prior to installation of temporary markings; and

5. once temporary lane realignments are no longer required, the roadway must be restored such that any temporary pavement markings are completely removed prior to installation of new permanent markings.

1-5.2.3 Flag-persons

A. All flag-persons must be ACSA certified.

B. Flag-persons must be deployed:

1. where required pursuant to the City of Edmonton Manual of Temporary Traffic Control;

2. where required pursuant to Alberta Transportation Traffic Accommodation in Work Zones; and

3. for any other situation where deemed necessary by a Hazard Analysis.

1-5.2.4 Record Keeping of Lane Closures / Traffic Control Devices / Collisions

A. The Design-Builder must inspect all Traffic Control Devices daily.

B. Throughout the Construction Period the Design-Builder must maintain accurate daily traffic accommodation inspection records including the following:

1. condition and placement, including changes, additions and removals, of all Traffic Control Devices;

2. compliance with the Transportation Management Plan, TARs, TAPs and TASs;

3. all traffic collisions and near miss incidents;

4. the dates, times, and content of all messages on all PCMS;

5. the date, time and location of Lane Closures;

6. the traffic accommodation closure type as set out in Section 1-5.2.9 [*Traffic Accommodation Closure Types*] of this Schedule; and

7. all other information required for accurate reconciliation of the Lane Closures and transit impact adjustments pursuant to Schedule 16 [*Payment Mechanism*].

C. The Design-Builder must report all traffic collisions and near miss incidents as noted in the Design-Builder's Safety Management Plan to the City and provide a copy of the completed collision or incident report within 72 hours of the occurrence.

D. The Design-Builder must prepare and submit to the City an electronic weekly summary of all daily traffic accommodation inspection records on or before the second Business Day of the subsequent week.

1-5.2.5 Roadway Closure Restrictions

A. The number of through traffic lanes on any Roadway must not be reduced to less than the applicable "Minimum Lanes to Remain Open" as set out in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*], except for crossover detours on AHD and except during a Full Closure. A parking lane may not be used as one of the "Minimum Lanes to Remain Open" as set out in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*].

B. Full Closures of a Roadway are only permitted in accordance with the applicable "Allowed Period of Full Closure" as set out in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*], with closure types defined as follows:

1. Closure 1: A Full Closure is not permitted

2. Closure 2: Full Closures are permitted for no longer than the period of time identified in the Accepted TAR for the closure. The TAR will be considered on a case-by-case basis and acceptance will depend on factors including, but not limited to:

   a. the classification of the roadway;

   b. the traffic / pedestrian / cyclist volumes using the roadway;

   c. adjacent land uses;

   d. adjacent Construction work;

   e. the type of proposed closure;

   f. the proposed timing of the closure;

   g. the proposed duration of the closure;

   h. the availability of detour routes;

i. the Construction activity requiring the closure; and

j. the availability of alternative Construction methodologies or staging.

3. Closure 3: Full Closure of AHD in either the westbound or eastbound direction accommodated by cross overs is permitted for girder installation between 22:00 and 06:00 in accordance with Section 1-5.2.2.2 [*TUC Requirements*] of this Schedule and as identified in the Accepted TAS for the closure.

4. Closure 4: Full Closure of the following ramps is allowed between 22:00 and 06:00 in accordance with Section 1-5.2.2.2 [*TUC Requirements*] of this Schedule and as identified in the Accepted TAS for the closure, to facilitate the cross over for bridge Construction activities or the installation of track:

   a. loop ramp onto eastbound AHD from 111 Street;

   b. directional ramp onto westbound AHD from 111 Street; and

   c. directional ramps onto 111 Street from AHD.

C. For roads within the City right-of-way not identified in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*], the “Minimum Lanes to Remain Open” will be equal to the “Total Existing Number of Lanes”, and Closure 2 is applicable.

D. Roadway Categories required by Section 3.1 [*Lane Closure Adjustment*] in Schedule 16 [*Payment Mechanism*] are assigned to each Roadway Section in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*]. Any roadway type, arterial, collector or local, of either public or private access not identified as permanent closure and not listed in the table will not be closed unless identified in the Accepted TAR for the closure.

E. Single Lane Closures (reduction in minimum lanes to remain open) may be permitted outside of peak hours as defined by the City of Edmonton Manual of Temporary Traffic Control. Peak hours on AHD are defined as 06:00 – 09:00 and 15:00 – 18:00, Monday through Friday. Peak hours on all other roadways are defined as 06:00 – 09:00 and 15:30 – 18:30, Monday through Friday. During these periods, work is not allowed to impact traffic on freeways, arterial roads, collector roads, and all roads within the OSCAM Permit Core Area, except in emergencies or where Parks and Roads Services has given approval through an OSCAM Permit.

Table 1-5.2.5.1: Roadway Section Restrictions and Roadway Categories

Roadway Section[1]	From	To	Roadway Classification	Roadway Category	Total Existing Number of Lanes[2]	Total Future Number of Lanes[2]	Minimum Lanes[2] to Remain Open	Allowed Period of Full Closure[3]	Existing Truck Route	Existing Transit Routes[4]
111 Street NW	**Century Park Transit Centre Access**	**23 Avenue NW**	**Arterial**	**3**	**4**	**6**	**2**	**1**	**Y**	**Y**
111 Street NW	23 Avenue NW	19 Avenue NW	Arterial	3	4	6	2	1	N	Y
111 Street NW	**19 Avenue NW**	**AHD**	**Arterial**	**3**	**4**	**5**	**2**	**1**	**N**	**Y**
23 Avenue NW	109 Street NW	Saddleback Road	Arterial	3	4	6	4	1	Y	Y
19 Avenue NW / Saddleback Road	109 Street NW	23 Avenue	Collector	1	3	2	2	2	N	Y
12 Avenue NW	Running Creek Road	112 Street NW	Collector	1	3	2	2	2	N	Y
9 Avenue NW	Running Creek Lane	112A Street NW	Collector	1	2	2	2	2	N	Y
AHD / 111 Street Ramp	**111 Street Southbound**	**AHD Westbound**	**Highway**	**3**	**1**	**1**	**1**	**4**	**Y**	**Y**
AHD	**111 Street NW**	**Heritage Valley Trail**	**Highway**	**3**	**6**	**6**	**4[5]**	**3**	**Y**	**Y**
Ellerslie Road SW	127 Street SW	Heritage Valley Trail	Arterial	3	4	4	2	1	Y	Y
127 Street	Ellerslie Road SW	OMF Access	Collector	1	2	2	2	2	N	N

Notes:

[1] Rows in bold reflect the main alignment of the LRT route.
[2] Through Lanes.
[3] Closure type (#) per Section 1-5.2.5.B [*Roadway Closure Restrictions*]
[4] Existing transit routes have been identified based on routes at the time of contract development. The City may update transit routes from time-to-time.
[5] Minimum of 2 lanes to remain open in each direction.

1-5.2.6 Traffic Accommodation Request (TAR)

A. The Design-Builder must prepare and submit a traffic accommodation request, (the "Traffic Accommodation Request", or "TAR") for each Transportation Closure, which must:

1. be in the form set out in Appendix 5-1C [*Traffic Accommodation Request Form*] to this Schedule;

2. have all fields on the form completed;

3. be assigned a unique and sequential number; and

4. include an attached TAP except within the TUC when it must include an attached TAS.

1-5.2.7 Traffic Accommodation Plan (TAP)

A. The Design-Builder must prepare and submit a traffic accommodation plan, (the "Traffic Accommodation Plan", or "TAP") for each Transportation Closure, except within the TUC, which must:

1. comply with the minimum safety measures identified in the City's Procedures for On-Street Construction Safety;

2. include all traffic control measures required for safe and efficient Transportation Management as determined through a Hazard Analysis associated with the Transportation Closure;

3. be prepared in the form of drawings, with related notes, which must include:

   a. the type of Transportation Closure including dates and timings for deployment and removal of the traffic accommodation measures and any periods of inactivity;

   b. layout and locations of temporary signage and any other traffic accommodation measures which will be used for the Transportation Closure;

   c. layout and locations of temporary bus stop placement including length of pull-in/out tapers and curbside surfacing details;

   d. locations and proposed content of the information and alternate route guidance signs to be deployed during the public notification period in accordance with Table 1-5.2.11.1 [*City Review and Public Notification Period*] of this Schedule and in accordance with Section 3.3 [*Construction Signage and Hoarding/Fencing Enhancements*] of Schedule 12 [*Communications and Engagement*];

   e. limits of the area that is to be protected by the Transportation Closure;

   f. details of measures to guide pedestrians and cyclists through the Transportation Closure;

   g. details of measures to be implemented to preserve existing accesses in accordance with Section 1-4.1.1 [*Coordination and Access*] of this Schedule;

   h. detailed layouts which follow the 'Examples of Typical Worksite Traffic Control Set-Ups' contained in the City's "Procedures for On-Street Construction Safety" to the extent applicable;

   i. details of emergency vehicle access routes to, through, or around each site;

   j. street lighting modifications in accordance with the TAC Guide for Design of Roadway Lighting;

k. locations of Roadway and Traffic Signal modifications outside the City Lands to accommodate traffic detours and bus rerouting;

l. details of the Construction activities requiring the Transportation Closure; and

m. authentication by a Professional Engineer registered to practice in the province of Alberta.

4. provide any other information that is necessary to assist in describing the planned traffic accommodation measures; and

5. identify a Design-Builder representative responsible to assist Emergency Services personnel responding to an incident within the Site.

B. TAP drawings must be prepared with a maximum scale of 1:1500, be submitted in landscape format on ANSI B size printed pages, each provided with a drawing number and a title that includes the location and type of Transportation Closure.

C. Where the City's Procedure for On-Street Construction Safety includes examples of typical traffic accommodation arrangements that are applicable to Transportation Closures, such arrangements should be used.

1-5.2.8 Traffic Accommodation Strategy (TAS)

A. The Design-Builder must prepare and submit a traffic accommodation strategy, (the "Traffic Accommodation Strategy", or "TAS") for each Transportation Closure within the TUC, which must comply with the requirements of Alberta Transportation Traffic Accommodation in Work Zones.

1-5.2.9 Traffic Accommodation Closure Types

A. Traffic accommodation Transportation Closures must be defined as a Major Transit Route Closure, a Major Lane Closure or a Minor Lane Closure, where:

1. a Major Transit Route Closure means:

a. a Full Closure;

b. a reduction of the number of through traffic lanes to a single lane in a single direction; or

c. implementation of a restriction on turning movements used by transit vehicles, within a Roadway section identified in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*] as being an existing transit route, or within a Roadway section which forms part of a detour for an existing transit route.

2. a Major Lane Closure means:

a. temporary Lane Closures on roadways that are classified in Table 1-5.2.5.1 [*Roadway Section Restrictions and Roadway Categories*] as collector, arterial, or freeway, where one or more lanes in either direction is closed during peak hours as identified in Section 1-5.2.2 [*Roadway Restriction Construction Requirements*] of this Schedule;

b. total closure of all lanes travelling in one direction or Full Closure of any Roadways that are classified as collector, arterial or freeway including traffic splits; or

c. a Lane Closure that exceeds 3 days in duration on any Roadway that is classified as collector, arterial or freeway.

3. a Minor Lane Closure means any closure of a Roadway, Sidewalk or SUP that is not a Major Lane Closure.

1-5.2.10 Transit Notification Period

A. Where a Transportation Closure is a Major Transit Route Closure, the applicable TAR must be submitted a minimum of 150 days in advance of the proposed start date of the applicable Transportation Closure.

1-5.2.11 City Review and Public Notification Period

A. All TARs must be submitted to the City, except that the Review Period will be as set out in Table 1-5.2.11.1 [*City Review and Public Notification Period*] and not the 15 Business Days specified throughout Section 4.2 [*Time for City Review*] of Schedule 2 [*Submittal Review Procedure*].

B. After a TAR has been Accepted by the City, the Design-Builder must provide public notification in accordance with Section 3.3 [*Construction Signage and Hoarding/Fencing Enhancements*] of Schedule 12 [*Communications and Engagement*] by posting information and alternate route guide signs at strategic locations on the approach to the related Transportation Closure(s). Information and alternate route guidance signs must be placed in advance of the Transportation Closure such that the public has adequate opportunity to divert prior to reaching the Transportation Closure(s).

C. The public notification must be posted in advance of implementing the closures for at least the time period specified in Table 1-5.2.11.1 [*City Review and Public Notification Period*] and must remain in place for the duration of the Transportation Closure.

Table 1-5.2.11.1: City Review and Public Notification Period

Closure Type	City Review Period	Public Notification Period
Major Transit Route Closure (outside the TUC)	20 Business Days	20 Business Days
Major Transit Route Closure (within the TUC)	25 Business Days	20 Business Days
Major Lane Closure (outside the TUC)	15 Business Days	20 Business Days
Major Lane Closure (within the TUC)	25 Business Days	20 Business Days
Minor Lane Closure (outside the TUC)	5 Business Days	5 Business Days
Minor Lane Closure (within the TUC)	25 Business Days	20 Business Days

D. Where PCMSs are used for information and as alternate route guidance signs, all messages must be current and applicable to the prevailing conditions.

1-5.3 SUP ACCESS ACROSS AND TO BLACKMUD CREEK RIVER VALLEY

A. The Design-Builder must submit SUP detour routing for times when access to the existing SUP on the 111 Street southbound Roadway Bridge and connecting into Blackmud Creek River Valley is closed.

B. The Design-Builder must provide an SUP trail detour and information signage plan. SUP detour information signage must include photos of the detour route, project start and end dates, scope, and contact information, and must be placed at all connecting trail heads, in the ravine, and at connections to the above bank SUPs.

SECTION 1-6 – PRE-CONSTRUCTION ASSET CONDITION SURVEY

1-6.1 GENERAL

A. A pre-Construction condition baseline survey of the properties and assets along the LRT Corridor has been completed by the City. Selected information will be provided on the Effective Date.

B. To the extent that the Design-Builder conducts additional pre or post Construction condition surveys or other observations, copies of all records, identified by physical address or location must be provided to the City within 30 days of completion of the applicable survey or observation, including:

   1. photographs, video, measurements, and narratives; and

   2. detailed descriptions of any observed variances from the conditions documented in the pre-Construction condition baseline survey included in the City conducted pre-Construction baseline survey.

C. The Design-Builder must provide the City with at least 10 days notice of such surveys. No additional survey may be conducted without a City representative being present.

SECTION 1-7 – DECONSTRUCTION

1-7.1 GENERAL

A. This Section 1-7 [*Deconstruction*] sets out the requirements for handling, salvage, storage, and disposal of existing material that is removed from the Lands to facilitate Construction of the Infrastructure.

B. Except as provided in Section 1-7.4 [*Elements to be Deconstructed or Removed from the Lands*] of this Schedule, the Design-Builder must ensure that no buildings, structures or components are partially or wholly deconstructed, demolished, renovated, removed, relocated or otherwise damaged in connection with, or as a result of, any Construction activities.

C. All deconstructed waste materials must be removed from the Lands and disposed of at appropriate provincially licensed facilities.

1-7.2 MATERIAL STORAGE, HANDLING, AND DISPOSAL

A. The Design-Builder must store materials and equipment to be re-used, recycled or salvaged:

1. in secured areas;

2. in a neat and tidy condition; and

3. only in non-residential areas.

B. To the extent practical, where materials can be diverted from the landfill, the Design-Builder must make every effort to divert at least 90% of all deconstructed materials by weight from landfills in accordance with Section 15 [*Contamination, Hazardous Substances and Waste*] of Schedule 10 [*Environmental Performance Requirements*].

C. All Construction waste management and disposal must comply with the requirements of Schedule 10 [*Environmental Performance Requirements*].

D. Notwithstanding Schedule 10 [*Environmental Performance Requirements*], excavated material from the LRT Corridor that is left behind or used in Construction must be proven to be safe to be left behind or used in Construction.

1-7.3 SALVAGE REQUIREMENTS

A. Subject to Section 1-7.5 [*Deconstruction Requirements*] of this Schedule, the Design-Builder has all salvage rights and entitlement to proceeds from the sale of deconstructed materials.

B. The Design-Builder is responsible for communicating salvage opportunities that could be of interest to Stakeholders in accordance with Section 3.2 [*Design and Construction Communications Services*] of Schedule 12 [*Communications and Engagement*].

1-7.4 ELEMENTS TO BE DECONSTRUCTED AND REMOVED FROM THE LANDS

A. Deconstruct and remove from the Lands the following elements:

1. Elements listed below to the extent that they directly encumber the Construction and are not essential to continued traffic operation or public safety:

a. City Recoverable Items which have not been recovered by the City within the timeframe described in Section 1-7.5.2 [*City Recoverable Items*] of this Schedule;

b. Roadway infrastructure in accordance with Section 1-7.5.3 [*Roadway Infrastructure*] of this Schedule;

c. Utility poles;

d. decommissioned Utility remnants in accordance with Section 3-5.4.2 [*Access to and Protection, Abandonment and Removal of Utility Infrastructure*] of this Schedule;

e. Traffic Signal Equipment and street lighting as described in Section 1-7.5.4 [*Traffic Signal Control Structures and Devices and Street Lighting*] of this Schedule; and

f. any other structure, facility or component specified to be removed, restored or relocated elsewhere in this Agreement.

1-7.5 DECONSTRUCTION REQUIREMENTS

1-7.5.1 General

A. For Sites on which Deconstruction Work is required:

1. the Design-Builder must remove all Utilities in accordance with Section 3-5.4.2 [*Access to and Protection, Abandonment and Removal of Utility Infrastructure*] of this Schedule; and

2. the Design-Builder must backfill all excavations created by the removal of substructures and foundations with engineered material suitable to the Deconstructed Work area intent.

B. For the existing 111 Street southbound traffic bridge, the Design-Builder must prepare and submit to the City a report authenticated by a Professional Engineer, containing the following information:

1. a legal site plan;

2. access to work area;

3. copies of all applicable Project Approvals and other authorizations and approvals required for performance of the applicable Deconstruction Work;

4. survey data of the original structure position and site characteristics;

5. utility locations, identified as capped or abandoned;

6. temporary works and support structures including stabilizing details and measures;

7. proposed type and capacity of equipment;

8. proposed sequence of work;

9. position of cranes relative to substructure elements such as abutment backwalls, with details of load distribution of wheels and outriggers;

10. lifting devices and lifting points showing lifting forces;

11. proposed demolition sequence;

12. waste / disposal manifests;

13. temporary supporting structures removal;

14. identification of remaining features and aspects;

15. representative photographs of the site before and after deconstruction; and

16. a record of any other known data that would affect future development on the site.

1-7.5.2 City Recoverable Items

A. The City may wish to recover or salvage the following existing items:

1. Bus Stop Materials including shelters, signs, ash containers, benches, waste receptacles, and waste and recycling receptacles, (collectively "*Bus Stop Materials*");

2. removable and replaceable components including mini barriers, bollards, concrete traffic barriers, bicycle racks, benches, bistro tables, cluster seating, waste receptacles, waste and recycling receptacles, precast parking curbs, variable message signs, fixed signs, newspaper boxes and similar components (collectively "*Removable and Replaceable Components*"); and

3. mailboxes.

B. The Design-Builder must notify the City in writing, not less than 15 Business Days and not more than 25 Business Days, prior to deconstructing or removing any Bus Stop Materials or Removable and Replaceable Components. The Design-Builder must not include in the Construction Schedule or otherwise plan to deconstruct or remove any:

1. Bus Stop Materials at more than five bus stops in any given week; and

2. removable and replaceable components in any week in a volume of items greater than what the City can reasonably remove within a week.

C. Except to the extent the City removes applicable Bus Stop Materials or Removable and Replaceable Components within 15 Business Days after receipt of the written notice in Section 1-7.5.2 [*City Recoverable Items*] of this Schedule, the Design-Builder must deconstruct and remove the applicable Bus Stop Materials or Removable and Replaceable Components within 25 Business Days of the written notice in Section 1-7.5.2 [*City Recoverable Items*] of this Schedule in accordance with Section 1-7.3 [*Salvage Requirements*].

D. The Design-Builder must notify the City in writing to request removal of mailboxes. Notice must be not less than 45 days and not more than 55 days prior to the date that removal of a mailbox is necessary to accommodate the related Construction.

1-7.5.3 Roadway Infrastructure

A. Where a new Roadway abuts areas of existing Roadway, the Design-Builder must remove the existing concrete and asphalt to create a straight, clean, vertical edge through the full depth of the pavement structure.

B. New Roadway construction must tie into existing Roadways at a future lane line or lip of gutter. Transitioning from new to existing pavement structures within a lane is not permitted.

1-7.5.4 Traffic Signal Control Structures and Devices and Street Lighting

A. The Design-Builder must maintain continuous safe operations for vehicular, pedestrian, and bicycle traffic.

B. No streetlight may be deconstructed or otherwise removed from service until temporary or permanent lighting measures meeting the requirements of Section 3-4.4 [*Construction Specifications*] of this Schedule are available in place of the streetlight(s) being deconstructed or removed. Permanent

lighting so provided must be maintained during the Construction Period in accordance with Section 1-4.5 [*Maintenance During Construction*] of this Schedule.

C. No Traffic Signal equipment may be deconstructed or otherwise removed from service until the Transportation Accommodation measures described in the Accepted TAP have been implemented. In accordance with Table 1-1.3.1 [*City Works*] item 29, the City will remove any temporarily installed traffic signals.

D. Where any of the following existing Traffic Signal equipment elements are removed, they must be protected from damage and delivered to the City (with an unloading device), within 2 weeks of removal, at a location to be coordinated with the City a minimum of 2 weeks prior to delivery:

   1. cantilever structures;

   2. poles, arms, and davit extensions;

   3. traffic controllers, cabinets, and video detection equipment;

   4. luminaires; and

   5. overhead signs.

E. Remove and protect from damage existing street lighting, including roadway lighting and pedestrian lighting, and deliver to the City (with unloading devices) within 2 weeks of removal, at a location to be coordinated with the City a minimum of 2 weeks prior to delivery.

SECTION 1-8 – PROJECT IDENTIFICATION, ACCESS AND MISCELLANEOUS REQUIREMENTS

1-8.1 PROJECT IDENTIFICATION SIGNS

A. The Design-Builder must provide, install, and maintain up to ten project identification signs.

1. Each project identification sign must:

a. be nominally a minimum of 8 feet x 8 feet in size, with the bottom of the sign located a minimum of 3.5 feet above-grade;

b. be constructed of solid materials that can withstand 80 km/h winds without affecting the readability of the signs;

c. be printed in full colour; and

d. comply with the signage requirements in Schedule 12 [*Communications and Engagement*] and the City Public Communications Design Guidelines, included as Disclosed Data.

2. Any damage to the project identification signs, including warping, delamination, and rust staining, must be repaired within 5 Business Days at the Design-Builder's cost.

3. Specific locations, content, and design requirements will be provided by the City within 60 Business Days after the Effective Date. All Project identification signs must be supplied, installed, and maintained at the required locations within 20 Business Days after receipt of location and content requirements or at a later date as instructed by the City.

B. Provide up to ten provincial funding signs of substantially the same dimensions and Construction as the Project identification signs described in Section 1-8.1A [*Project Identification Signs*]. Specific locations and content requirements will be provided by the City within 60 Business Days after the Effective Date. All provincial funding signs must be supplied, installed, and maintained at the required locations within 20 Business Days after receipt of location and content requirements or at a later date as instructed by the City.

C. Provide up to ten federal signs of substantially the same dimensions and Construction as the Project identification signs described in Section 1-8.1A [*Project Identification Signs*]. Specific locations and content requirements will be provided by the City within 60 Business Days after the Effective Date. All federal funding signs will be supplied, installed, and maintained at the required locations within 20 Business Days after receipt of location and content requirements or at a later date as instructed by the City.

D. The Design-Builder must inspect the project identification signs on a monthly basis to ensure they are well-maintained and free of damage, and that all content on the signage is up to date.

E. The City has pre-installed five City project identification signs and five federal project identification signs.

1. Pre-installed project identification signs are at the following locations:

a. two each at the 23 Avenue NW and 111 Street NW intersection;

b. one each at the 19 Avenue NW and 111 Street NW intersection;

c. one each at the 12 Avenue NW and 111 Street NW intersection; and

d. one each at the 9 Avenue NW and 111 Street NW intersection.

2. The Design-Builder must maintain and inspect the five City project identification signs and five federal project identification signs as described in Section 1-8.1D [*Project Identification Signs*].

1-8.2 VEHICLE ACCESS AND PARKING

1-8.2.1 General

A. The Design-Builder must ensure that only designated points of access and access routes are used for movement of workers and equipment, and the delivery of materials.

1-8.2.2 Haul Routes

A. Per the City's *Traffic Bylaw*, 5590, the Design-Builder must not operate any vehicle so as to track any earth, sand, gravel or other material on the roadway. Any tracking or spillage must be cleaned up within 4 hours.

1-8.2.3 Construction Parking

A. With the exception of traffic control crews, workers are not permitted to park on streets, including any on-street parking or in-service roads, or in any public parking lots.

B. Parking is not permitted within 5 metres from the trunk of any tree or native/naturalized tree stand.

1-8.3 TEMPORARY BARRIERS AND ENCLOSURES

A. Where Construction may constitute a hazard to the public, work must not commence until a temporary fence, hoarding, barricade, or covered way is erected between the Site and the adjacent public areas.

B. All temporary fencing, hoarding, barricades, or covered ways will comply with Part 8 of the NBCAE at all times during the Term and must adhere to Section 2.1(h) [*General Obligations*] of Schedule 12 [*Communications and Engagement*].

1-8.4 PROJECT CLEANLINESS

1-8.4.1 General

A. The Design-Builder must maintain Sites in a tidy condition, free from accumulation of waste products and debris.

B. The Design-Builder must provide containers on Site for collection of waste products and debris.

C. Burning of waste products and debris is not permitted.

D. The Design-Builder must clear and remove snow and ice from all accesses to the Sites in accordance with the City's *Snow and Ice Control Policy* (C409K) and the *Community Standards Bylaw*, 14600.

E. Depositing Construction debris and waste products on Roadways, sidewalks or any other public areas is prohibited.

1-8.4.2 Final Cleaning

A. Prior to Construction Completion, the Design-Builder must:

1. remove surplus products, tools, Construction machinery, and equipment from the Lands;

2. broom clean and pressure wash all exterior walks, steps and all other hard surfaces of Stations and Structures, including the interior of Stations and Structures;

3. remove dirt and other disfiguration from exterior surfaces;

4. remove any snow and ice from sidewalks, amenity nodes, SUP, Trackways, Stations, and other Structures;

5. remove any protective/anti-compaction mulch placed within 5 metres of retained trees. Tree wells and shrub beds to remain mulched as specified in Section 2-9 [*Landscape Architecture*] of this Schedule; and

6. clean and polish glass and bright surfaces.

1-8.5 WILDFIRES

A. The Design-Builder must implement precautions to prevent ignition sources from Construction activities causing wildfires and must:

1. provide and maintain firefighting equipment at locations used to store flammable materials including fuels, lubricants, and other petroleum products; and

2. establish designated smoking areas away from any fuel sources including those where flammable materials are stored, and away from any vegetated areas.

1-8.6 HAZARD TREES

A. The Design-Builder must remove all trees that are deemed a fall hazard by the Arborist prior to commencement of further Construction activity in any areas at risk from the fall hazard. Trees must be removed from:

1. within the Lands in accordance with Section 2-12 [*Tree Retention, Removal and Protection/Preservation*] of this Schedule; and

2. outside the Lands in accordance with Section 2-12 [*Tree Retention, Removal and Protection/Preservation*] of this Schedule and with Section 3.16 [*City Lands and Incorporated Infrastructure Adequate*] of the Agreement. If a tree adjacent to City Lands has branches that extend into City Lands that require pruning due to fall hazard, the Design-Builder must follow the procedures outlined in Section 2-12.1.6 [*Branch Management Procedures*] of this Schedule.

SECTION 1-9 – SPARE PARTS

1-9.1 SUPPLY OF SPARE PARTS

A. The Design-Builder must supply Spare Parts to the City for all systems and subsystems provided as part of the Project in accordance with the Spare Parts List as set out in Section 5.5.10.4 [*Spare Parts*] of Schedule 4 [*Design and Construction Protocols*], and as agreed by the City.

B. Spare Parts must be:

1. new, unused items;

2. identical to the items placed into service; and

3. provided 3 months in advance of Construction Completion.

C. The Design-Builder must make suitable supply arrangements to ensure that ordering, shipping and handling, and storage charges are minimized while taking advantage of volume pricing and ensuring equipment compatibility.

D. The Spare Parts List must include, at a minimum, the quantity of Spare Parts listed in Table 1-9.1 [*Minimum Required Spare Parts*].

Table 1-9.1: Minimum Required Spare Parts

SYSTEMS MATERIALS	QUANTITY
Train Control System	
Block signal (each lamp arrangement)	2 of each type
Switch Position Indicator	2
Vital Logic Controller and Field replicable component parts	2 of each type
Train detection device, including Track Circuit, Automatic Train Protection system (Speed Check, Magnetic Trip-Stop system) and Wheel detector.	2 of each
Centralized Control System (CCS) component parts	2 of each
Local Control Panel (LCP)	2
At-Grade Crossings	
At-Grade crossing component parts (bells, gates, motors, traffic lights, …)	4 of each equipment
Networking, CCTV, Radio, Telephone and Security Systems	
PA/VMS system	
Speakers (Ceiling, surface mount, horn)	5 of each type
Variable message sign	2
Microphones	2 of each type
Telephone system	
Staff Service Phone	5

SYSTEMS MATERIALS	QUANTITY
Public information phone	5
Emergency phone	5
ROW telephone	5
CCTV cameras	
Fixed	10% of total
PTZ	10% of total
Radios	
Data radios for Llew Lawrence OMF yard.	4
Security devices	
Access card readers	10
Door sensors	10
Overhead Catenary System	
Full tension length auto-tensioned individual consecutive OCS section including: a. Messenger wire b. Contact wire c. Hangers/droppers d. Balance weight anchor termination e. Mid-point anchor f. Jumper wires	1 (maximum tension length to be installed on the system)
Messenger Wire	1 drum (based on maximum drum size/length)
Contact wire	1 drum (based on maximum drum size/length)
Cantilevers	25
Disconnect Switch	1 of each type
Surge arrester	2
Section Insulator	2 of each type
Section insulator runners and tips	3 for each type of section
Splices for various wire/conductor	4 each type
Poles	1 of each
Traction Power	
Transformer Rectifier unit	1 of each type of make
Station Standby Transformer	1 of each type of make

SYSTEMS MATERIALS	QUANTITY
MVAC Circuit Breaker, truck mounted, completely assembled and functional	4 of each type of make
Rectifier DC Circuit Breaker, truck mounted, completely assembled and functional, diode bridge	2 of each type of make
Track Feeder DC Circuit Breaker, truck mounted, completely assembled and functional	4 of each type of make
Rectifier	2
Frame leakage relay	2
Closing and Tripping coils for AC circuit breaker	2 of each type of make
Battery charger	1
PLC power supply	1
No. Protective relays and Metering Devices	
DC Protection relay + module	2
AC Protection relay + module	2
DC fuses	5
Closing coil for a DC circuit breaker	2 of each type of make
Trip coil for a DC circuit breaker	2 of each type of make
Spring charging motor for a DC circuit breaker	2 of each type
Complete set of all types of current limiting fuses	2 complete sets

MAINLINE TRACK MATERIALS	QTY	UNIT
Running Rail		
115 Lb. RE Rail (Estimated)	24	Ton
Special Trackwork		
Switch Points		
No. 8 left-hand turnout	3	Sets
No. 8 right-hand turnout	2	Sets
Frogs		
No. 8 turnout	4	Frog
Switch Point Protectors		
No. 8 turnout	4	Set
DF Track		
Insulated Rolled Baseplates with Fastening Hardware (assumed 500 mm spacing)	175	Each

MAINLINE TRACK MATERIALS	QTY	UNIT
Ballasted Track		
Concrete ties with Fastening Hardware (assumed 675 mm spacing)	430	Each
Road At-Grade Crossings (in Tie and Ballast track)		
Concrete Crossing Panels	6	Lin-m
Gauge side rubber rail seals	12	Lin-m
Field side rubber rail seals	12	Lin-m
OTM		
Bumping Post	1	Each
Switch Machine and Air Curtain Blower	4	Each

OMF TRACK MATERIALS		QTY	UNIT
Running Rail			
115 Lb. RE Rail (Estimated)		24	Ton
Special Trackwork			
	Switch Points		
	No. 5 right-hand turnout	2	Set
	No. 5 left-hand turnout	2	Set
	Frogs		
	No. 5 special turnout	4	Frog
	Switch Point Protector		
	No. 5 turnout	4	Set
	Switch Point Machine & Blower		
	No. 5 turnout	2	Set
Ballasted Track			
Concrete Ties with full assembly (*if used)		151	Set
Timber Ties with full assembly (*if used)		182	Set
Embedded Track			
Embedded Track Ties with fully assembly		49	Set
Snap-on Rubber Flangeway Filler (Estimated)		146	Lin-m
Pit Track			
Pit track fastener full assembly (assumed 500 mm spacing)		36	Each
Elevated DF Track			
To be included as part in Mainline Track spare parts			

OMF TRACK MATERIALS	QTY	UNIT
Road and Pedestrian Crossings		
Road Crossing Panels	2	m panels
Pedestrian Crossing Panels	2	m panels
Gauge side rubber rail seals	6	Lin-m
Field side rubber rail seals	6	Lin-m
OTM		
Sliding Bumping Post	1	Each
Wheel Stops/Chokes (assuming 2 per track)	2	Each

OMF BUILDING MATERIALS	QTY	UNIT
Mechanical – Division 21		
Sprinkler Heads	Per NFPA 13	
Mechanical – Division 23		
Spare filters for air handling equipment at turn-over	12 per filter type and size	
Heat recovery unit damper actuators	2 per actuator size	

OTHER	QTY	UNIT
OMEGA Fencing		
Fencing panels, each complete with 2 posts and hardware	3	Each

APPENDIX 5-1A: PROJECT DESCRIPTION DRAWINGS

APPENDIX 5-1B: HIGH FLOOR OPERATIONS AND MAINTENANCE PARAMETERS

APPENDIX 5-1C: TRAFFIC ACCOMMODATION REQUEST FORM

APPENDIX 5-1D: APPROVED PRODUCTS LIST