

## **YEG XLB Conveyor Lines E and F Replacement Platform Modifications**

1-1000 Airport Road  
Edmonton International Airport AB

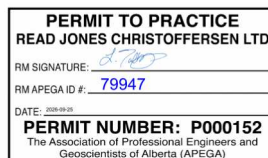
**TECHNICAL SPECIFICATIONS (05 00 50,  
05 12 00), AND DRAWINGS (S101, S201 TO  
S204 INCL., S301)**

Prepared for:

Edmonton Regional Airports Authority  
1-1000 Airport Road  
Edmonton AB T9E 0V3

Prepared by:

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RJC No. EDM.018830.0169

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## **1.0 GENERAL**

### **1.1 Description of Work Included**

- .1 Provide labour, materials, equipment, access, cooperation, coordination, and services to allow testing of structural steel and welds to be carried out by Testing Agency.
- .2 Scope of required quality assurance testing is described in this Section to inform Contractor of type and scope of testing on project and to allow Contractor to make appropriate allowances.
- .3 Testing required for Contractor's own quality control or as noted in clause 1.4.3 will be paid for by Contractor.

### **1.2 Reference Standards**

- .1 Testing of structural steel to conform to requirements of following Standards unless otherwise required by this Specification:
  - .1 CSA S16:24 –Design and Construction of Steel Structures
  - .2 CSA W178.1:18 (R2023) – Certification of Welding Inspection Organizations
  - .3 CSA W59:24 – Welded Steel Construction
  - .4 CSA G40.20-13/G40.21-13 (R2023) – General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  - .5 ASTM A6/A6M-26a – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
  - .6 RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts
  - .7 ASTM A435/A435M-17(2023) – Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates
  - .8 ASTM A786/A786M-15(2025) - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
- .2 Where the Standard is referenced in this Specification, it means documents specified in this clause and their referenced Standards.
- .3 Where there are differences between the Specifications and Drawings and the codes, standards, or acts, the most stringent shall govern.

### 1.3 Definitions - For This Section

- .1 "Owner", "Contractor", and "Consultant" per the General Conditions and Definitions.
- .2 "Structural Engineer" means a representative of Read Jones Christoffersen Ltd.
- .3 "Testing Agency" means a third-party testing and inspection agency.
- .4 "Non-Destructive Testing" means liquid penetrant (LP), magnetic particle (MP), ultrasonic (UT), or radiographic testing (RT) as determined appropriate by Testing Agency.
- .5 "Standard" and "Standards" mean reference standards listed under "Reference Standards" in this Section.

### 1.4 Appointment of Testing Agency

- .1 A CSA-Approved Testing Agency (approved under W178.1 - Building Category) shall be appointed to test structural steel and connections in accordance with Part 3.0.
- .2 Unless stated otherwise, Testing Agency shall be engaged by the Consultant on behalf of the Owner.
- .3 Contractor shall pay for testing not covered in clause 1.4.1, including but not be limited to:
  - .1 Testing of pre-approved connections not on structural Drawings and required by Contractor for ease of fabrication, transportation, or erection.
  - .2 Additional costs due to overtime, shift work, and holiday or weekend work required to meet schedule.
  - .3 Costs for retesting or additional testing due to work having failed to meet specified requirements.
  - .4 Non-destructive testing will be performed on samples of work as outlined in Article 3.3 of Specification. Repair and re-testing shall be done at Contractor's expense.
  - .5 Deficiencies in work will trigger required additional testing.

## 2.0 DUTIES

### 2.1 Responsibility of Contractor

- .1 Cooperate fully with Testing Agency. Allow free access to all parts of the work for testing and review at all times.

- .2 Notify Testing Agency and Structural Engineer when work is ready for review.
- .3 Prior to commencement of work, provide schedule of shop fabrication and erection to Testing Agency and Structural Engineer. Changes in this schedule shall be communicated to these parties in a timely fashion.
- .4 Provide quantity takeoff of all members in project for use in determining number of members required for testing. This takeoff should also indicate divisions in which members are to be fabricated to aid in shop inspection planning.
- .5 Provide mill certificates in accordance with the Standard, properly correlated to elements being fabricated.
- .6 Make available non-destructive testing reports performed in shop during fabrication.
- .7 Prep areas requiring Non-Destructive Evaluation or Testing (NDE/NDT) to an acceptable level. Preparation includes, but is not limited to:
  - .1 Ultrasonic Testing (UT) to 300 mm away from weld by grinding off weld splatter and buffing area with wire wheel.
  - .2 Provision of necessary access platforms or scaffolding to allow inspections to be carried out.
- .8 Contractor is solely responsible to provide finished product that meets Specifications and Contract Documents. Testing is not carried out for Contractor's benefit, nor does it make Structural Engineer or Testing Agency guarantors of Contractor's work.

## **2.2 Responsibility and Duties of Testing Agency**

- .1 Testing Agency has authority to, and is expected to, reject any work not meeting Specifications.
- .2 Identify number, type, and locations of members, connections, studs, etc. to be tested and coordinate required shop and site visits.
- .3 Review structural Drawings and Specifications prior to carrying out work.
- .4 Provide testing per the Standards and this Specification.
- .5 Provide timely test reports to Structural Engineer and Contractor.

### **3.0 TESTING AND INSPECTION**

#### **3.1 General**

- .1 Structural Engineer may reject, at any time during progress of work, a piece of material or member which Structural Engineer may find defective or not in accordance with detailed drawings. This material may be rejected notwithstanding any previous acceptance; replace rejected components at no expense to Owner. In case of dispute, decision of Structural Engineer will be final.
- .2 If initial tests indicate that work failed to meet Specification, Structural Engineer will decide if additional testing is necessary. This testing shall be completed by agency chosen by the Structural Engineer on the Owner's behalf.
- .3 Non-destructive testing operators shall have Level II qualification as a minimum.

#### **3.2 Documents and Materials**

- .1 Confirm that fabricator and erector are certified to CSA W47.1 and that welders are properly qualified.
- .2 Review mill certificates for all types of material used in project to ensure they meet requirements of 05 12 00 and forward to Structural Engineer.
- .3 Review approved shop welding procedures.
- .4 Confirm welding consumables provided will meet levels of strength, notch toughness, and quality of base member and that they are properly stored in shop and field.
- .5 Review bolt storage, handling, and installation procedures including pre-installation verification testing as required depending on types of bolts or washers to be used.
  - .1 Tension Control (TC) Bolts
    - .1 Carry out pre-installation verification in accordance with CSA S16 to confirm bolts will function as intended.
  - .2 Direct Tension Indicator (DTI) Washers
    - .1 Review fabricator installation procedures.
    - .2 General review for damage to washers prior to installation.
- .6 Review available non-destructive testing reports performed by Contractor.
- .7 Where more than one type of paint is specified, colour of each coat of paint shall differ so they can be visually identified after applications.

- .8 Obtain invoices and product data from steel supplier for purchase of specified primers and paints required for project. Circulate these documents to Structural Consultants.

### 3.3 Visual Testing (VT) of Members and Connections (Welded or Bolted)

- .1 Perform visual testing of structural components, framing, and connections through a combination of shop and field visits to meet requirements below.

| Structural Framing                                      | Total Project Minimum Sampling |
|---------------------------------------------------------|--------------------------------|
| Columns & Base Plates                                   | 15%                            |
| Bracing                                                 | 15%                            |
| Beams & Joists (Infill members supporting roof / floor) | 10%                            |
| Moment Connections (By Member Weight)                   | 50%                            |
| Splices                                                 | 100%                           |
| Section Reinforcement & Stiffeners                      | 30%                            |

- .2 Visual Testing (VT) requirements above include but are not limited to verifying:
- .1 Grade markings on structural steel in fabricator's plant prior to fabrication.
  - .2 Dimensions, including cross-section, in relation to specified members (in-house plant QC may be relied upon to perform this task assuming testing agency is satisfied with level of QC being carried out).
  - .3 Locations of holes, cuts, fittings, and milling of member ends.
  - .4 Tolerances of joint preparation and fit up (bevel angle, etc.) to be in accordance with CSA S16.1, clause 28.5 Joints in Contact Bearing.
  - .5 Preheat and interpass temperatures based on approved welding procedures.
  - .6 Snug tight bolted connections are properly compacted and brought to snug tight condition progressing outward from most rigid part.
  - .7 Erection tolerances meet tolerances of CSA S16.
  - .8 Steel surface preparation prior to priming and/or painting is in conformance with requirements of Structural and Architectural Specifications.
- .3 Defects noted during Visual Testing (VT) work shall be reviewed using appropriate comprehensive Non-Destructive Evaluation (NDE), which is in addition to requirements in clause 3.4.

### 3.4 Comprehensive NDE Testing of Connections (Welded or Bolted)

- .1 Perform testing of connections through combination of shop and field visits to meet sampling required in Table 1.
- .2 Requirements of Table 1 include but are not limited to verifying:
  - .1 Test at least one type of unique connection irrespective of sampling requirements.
  - .2 Bolt types conform to Drawings and Specifications prior to start of bolting operations and that pre-installation verification has been completed.
  - .3 Test bolted connections in accordance with CSA S16 with minimum two bolts tested for each pre-tensioned connection.
  - .4 For bolted connections that are indicated as pre-tensioned or slip critical, pre-installation verification testing is performed by inspector in cooperation with Contractor.
  - .5 For bolted connections indicated as pre-tensioned or slip critical, Testing Agency to be present during installation with sufficient frequency so pre-tensioning methods of RCSC 8.2.1, 8.2.3, or 8.2.4, as appropriate, are performed.
  - .6 Welded connections shall be tested in accordance with Annex P of CSA S16 clause 9.5 with an inspection class of IC1 (Minor).
  - .7 When overall length of weld is less than 900 mm, test entire length.
  - .8 Splices not shown on structural drawings to be 100% ultrasonically tested (UT) at Contractor's expense.

**Table 1: Single Piece Members**

| <b>Structural Framing</b>          | <b>Minimum Total % Connection Testing</b> |
|------------------------------------|-------------------------------------------|
| Columns & Base Plates              | 10%                                       |
| Bracing                            | 10%                                       |
| Beams & Joists                     | 7.5%                                      |
| Moment Connections                 | 10%                                       |
| Splices                            | 100%                                      |
| Section Reinforcement & Stiffeners | 25%                                       |

- .3 Post-installation review of bolts using following techniques:
  - .1 Conventional bolts
    - .1 Turn of nut method marked on washer and bolt head or calibrated torque wrench.
  - .2 Tension Control (TC) Bolts
    - .1 Post-installation review to confirm bolt tip is sheared off at tension control point.
  - .3 Direct Tension Indicator (DTI) Washers
    - .1 Post-installation review to confirm even bearing of connection and that no obstructions are present that would cause uneven pressure to be applied to DTI.

**END OF SECTION**

## 1.0 GENERAL

### 1.1 Description of Work Included

- .1 Provide labour, materials, equipment, and services to supply, design, and erect structural steel required and/or indicated on Drawings or specified herein, including supply of plates and/or angles for embedded steel parts, deformed bar anchors, wedge anchors, and epoxy anchors that will form connection between structural steel or concrete; and reinforcement of steel deck or floor openings. Report discrepancies between structural Drawings and existing conditions Structural Engineer immediately.

### 1.2 Reference Standards

- .1 Structural steel to conform to requirements of following Standards unless otherwise required by this Specification:
  - .1 CSA S16:24 – Design and Construction of Steel Structures
  - .2 CSA G40.20-13/G40.21-13 (R2023) – General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel
  - .3 ASTM A6/A6M-26a – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
  - .4 CISC Code of Standard Practice for Structural Steel
  - .5 ASTM A992/A992M-22 – Standard Specification for Structural Steel Shapes
  - .6 ASTM F3125/F3125M-26 – Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi, 144 ksi, and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
  - .7 ASTM F1554-20 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
  - .8 CSA W59:24 – Welded Steel Construction
  - .9 ASTM A786/A786M-15(2025) – Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
  - .10 SSPC SP-6 – Commercial Blast Cleaning
  - .11 CISC CPMA Standard 1-73a – A Quick-Drying One-Coat Paint for Use on Structural Steel.
- .2 Where the Standard is referenced in this Specification, it means documents specified in this clause and their referenced Standards.

- .3 Keep a copy of S16 and W59 on site and available for reference during the Work.
- .4 Where there are differences between the Specifications and Drawings and the codes, standards, or acts, the most stringent shall govern.

### 1.3 Definitions - For This Section

- .1 "Owner", "Contractor", and "Consultant" per the General Conditions and Definitions.
- .2 "Structural Engineer" means a representative of Read Jones Christoffersen Ltd., herein also referred to as RJC.
- .3 "Specialty Structural Engineer" is a Professional Engineer registered in Alberta responsible for components designed by Contractor and who seals and signs shop drawings.
- .4 Notwithstanding the previous, specialty engineer shall also be registered in jurisdiction where fabrication is performed if different than jurisdiction where project is located.
- .5 "Testing Agency" means the testing agency responsible to the.
- .6 "Standard" and "Standards" mean reference standards listed under "Reference Standards" in this Section.

### 1.4 Qualifications

- .1 Fabricator, erector, and subcontractors performing structural steel work shall be certified under requirements of Division 1, or Division 2.1 of W47.1. Design calculations shall be carried out by or under direct supervision of qualified Specialty Structural Engineer licensed in Alberta.
- .3 Engineers responsible for welding design, procedures, and practice shall be certified in accordance with CSA W47.1, Clause 6.1.
- .4 Specialty Structural Engineers responsible for design of steel work, connections, and the like, shall be insured in accordance with Engineering and Geoscience Professions Act of Alberta and covered under a General Liability Insurance Policy in accordance with provisions of the Contract.
- .5 Structural steel fabricator to have minimum of 10 years experience in fabrication of structural steel.
- .6 Erector to have minimum 10 years experience in erection of structural steel.

## 1.5 Examinations

- .1 Take dimensions from Drawings and verify by field measurement (including verification of interfacing with existing structures). Contractor shall be responsible for correctness of such measurements and report to Structural Engineer, in writing, of all discrepancies between measurements in field and those shown on Drawings prior to commencing work. Verify location of anchor rods and connections to existing structure and confirm that work prepared by other trades is at proper elevation, in line, level, and true.

## 1.6 Submittals

- .1 Submit following documents:
  - .1 Documents required as a part of Article 1.4 Qualifications.
  - .2 Qualifications of Fabricator
    - .1 Submit appropriate documentation for fabricator responsible for steel work in accordance with Article 1.4.
  - .3 When requested, Fabricator and Erector CWB Welding Qualifications and Procedures
    - .1 Qualification of steel fabricators and erectors for welding under Canadian Welding Bureau requirements.
    - .2 Description of welding procedures for use on structural steel minimum one month prior to fabrication or use.
    - .3 Ability to weld reinforcing steel to structural steel in accordance with CSA W186.
  - .4 Material Properties Reports
    - .1 When requested, copies of mill test reports properly correlated to materials used on project. Review clause 2.1.1 and provide reports as required to demonstrate conformance with chemical content parameters.
  - .5 Testing and Inspection Reports (submit throughout construction)
    - .1 Non-destructive testing reports, steel testing, and weld testing reports performed in addition to third party testing.
  - .6 Shop and Erection Drawings
    - .1 Submit appropriate documentation for fabricator responsible for steel work in accordance with Article 1.6.

.7 Erection Surveys

- .1 When requested, submit accurate surveys of steel erection as noted in this Specification and on Drawings.

**1.7 Shop and Erection Drawings**

- .1 Structural Drawings, structural models, and electronic files shall not be reproduced in whole or in part, and shall not be used to prepare shop, erection, or setting drawings. Structural models and electronic files may be used by Contractor under the following conditions:

- .1 Copyright remains with Read Jones Christoffersen Ltd.
- .2 Drawings will only be used for shop drawings for this project and not put to any other use.
- .3 Read Jones Christoffersen Ltd. assumes no liability for errors or omissions in Drawings. Contractor assumes all risk and expenses associated with use of structural Drawings in production of their work.
- .4 References to Read Jones Christoffersen Ltd. must be deleted from title block.
- .5 Contractor signs a release available from Read Jones Christoffersen Ltd. that addresses the above items in more detail.

- .2 Structural drawings shall not be scaled.

.3 Erection Drawings

- .1 Include sealed erection drawings with each submission of detailed shop drawings.
- .2 Erection drawings to clearly show setting out dimensions for structural steel frame, including dimensions confirmed by site measurement. Tie dimensions into relevant grid lines or reference points wherever possible.

.4 Shop Drawings

- .1 Submit detailed shop drawings for structural members that show details necessary for fabrication of component parts of structure.
- .2 Shop drawings, as a minimum, show the following:
- .1 layout;
- .2 member sizes;
- .3 connection details, including member cuts and copes where applicable;

- .4 bearing details;
- .5 splice locations and details (splices not shown on shop drawings will be rejected);
- .6 holes;
- .7 camber;
- .8 finishes;
- .9 grade(s) of steel;
- .10 bolt or threaded fastener material grade, size, and designation;
- .11 weld type, size, extent, and if shop or field applied with AWS welding symbols as specified in CSA W59 Appendix D and E;
- .12 architectural clearance lines and finishes where connection and the like may encroach with other work.
- .3 Provide shop drawings locating anchor rods, plates, and other devices.
- .4 Review of shop drawings by Structural Engineer is intended as an assistance to Contractor and does not relieve Contractor of responsibility for completeness or accuracy of their work and its conformance with Contract Documents.
- .5 Fabrication that commences prior to shop drawing review by Structural Engineer is at risk of Contractor.
- .6 Clearly identify on shop drawing all revisions, changes, or modifications.
- .7 Resubmit reviewed shop drawings where noted in review stamp, or when Contractor makes revisions for their own purposes.
- .8 Perform and submit complete survey, before steel fabrication commences, of position and alignment at all points where construction ties into existing structure. Include plan location positions relative to building gridlines, and elevations of bearing surfaces and tops of bolts/rods relative to building Datum elevation. Include Xray and conveyor system support locations in coordination with the equipment supplier.
- .9 Allow at least two weeks (10 working days) for shop drawing review by Structural Engineer.
- .5 Field Work Details
  - .1 Location of field work details shall be clearly identified or referenced on erection drawings.

- .2 Prepare setting drawings showing dimensions and details for setting structural steel connections, anchorages, assemblies and the like where they interface with other building components and support work of this Section.
- .3 Steel contractor shall incorporate other trade's work as directed by Construction Manager.
- .4 Furnish Inspection Company with a copy of each shop, erection, and setting drawing bearing Consultant's shop drawing stamp marked reviewed.

### **1.8 Supply of Alternate Products**

- .1 Should rolled sections or any other structural steel element shown on Drawings not be available or procurable, or should substitution for those sections be desired, sections of equivalent or greater mechanical properties (strength, stiffness, etc.) may be substituted if approved by RJC in writing. Material and structural section substitutions, if accepted, will be at Contractor's cost.

### **1.9 Testing and Field Review**

- .1 See Section 05 00 50.
- .2 Prior to commencement of work, provide schedule of shop fabrication to Testing Agency.
- .3 Advise Testing Agency of scheduling of shop and field work pertaining to this Project. Permit testing agency full access to fabrication shop and site for purpose of carrying out their work and provide all assistance required to aid in performance of inspection and testing.

### **1.10 Storage and Handling**

- .1 Protect steelwork during fabrication, shipping, storage, and construction. Steel work that is bent, broken, or otherwise damaged shall be repaired or replaced by Contractor prior to erection, to satisfaction of Structural Engineer and at no cost to Owner.
- .2 Contractor shall be responsible for proper scheduling of delivery and erection for structural steel in accordance with construction schedule.
- .3 Store structural steel members at site above ground on platforms, skids, or other devices so that ground dampness will not affect bottom members of stacks.
- .4 Protect steel stored outdoors after fabrication from accumulation of standing water.
- .5 Store other materials in weather tight and dry place until ready for use in the Work.
- .6 Store packaged materials in their original unbroken packages or containers.

### 1.11 Coordination with Other Trades

- .1 Supply necessary instructions and drawings to other trades for setting bearing plates, anchor rods, and other members that are built in with work of other trades. Coordinate with drawings of other disciplines for locations and details. Supply necessary material in accordance with construction schedule.
- .2 Coordinate with the equipment supplier to ensure supports for Xray machines and conveyor systems are installed in the correct locations.

## 2.0 PRODUCTS

### 2.1 Materials

- .1 Structural Steel
  - .1 Steel to be new, unless otherwise indicated, of sizes and shapes listed in current CISC Handbook or AISC Handbook, and as indicated on Drawings.
  - .2 CISC and CWB recommend steel have maximum boron content of 0.0008%. Refer to CISC and CWB bulletins detailing these recommendations. Contractor is fully responsible for providing steel meeting this boron content limit. Where this is not possible, or cannot be verified, welding procedures to address high boron content present in steel to prevent cracking, premature failure, or other undesirable performance of weldments from occurring. When requested, provide stamped letter from Fabricator's Welding Engineer confirming this provision has been met.
  - .3 Structural wide flange shapes (W) to conform to CSA G40.20/ G40.21 grade 345WM.
  - .4 Angles (L), plates, channels (C, MC) and miscellaneous beams (S, ST, M and MT) to conform to CSA G40.20/G40.21 grade 300W.
  - .5 Square and rectangular hollow structural sections (HSS) to conform to CSA G40.21 - Grade 350W, Class C.
  - .6 Rolled plates and bars shall conform to CSA G40.20/G40.21 grade 300W.
  - .7 Anchor Rods: Conform to ASTM F1554 Grade 36, 55, 105 unless otherwise noted or shown.
  - .8 Bolts, Nuts and Washers: Conform to ASTM F3125.
  - .9 Checker plate: raised diamond pattern checker plate; ASTM A36 steel with minimum yield strength 248 MPa or better.

- .2 Shop Paint/Primer
  - .1 Shop primer, paint, and joint filler are to reasonably match existing structure.
  - .2 Shop Paint, Unless Noted Otherwise: To CISC/CPMA 1-73a or SSPC Paint 15.
  - .3 Shop Primer, Unless Noted Otherwise: To CISC/CPMA Standard 2-75.
- .3 Welding consumables for processes shall be fully approved by Canadian Welding Bureau and certified by manufacturers as complying with requirements of this Specification. Such certificates shall be not more than two years old.
- .4 Welding electrode strengths to be equal to E49XX (E70XX) or better, and to be matched to base metal capacity.
- .5 Grout for column bases shall be non-metallic, non-expanding, and non-shrink type with minimum strength of 35 MPa (minimum) at 28 days, unless noted otherwise on Drawings. Grout may be placed in a dry pack or flowable consistency.

## 2.2 Design

- .1 General
  - .1 If fabricator's engineer requires additional information or clarification to aid in design of their work, request this information in a timely and appropriate manner.
- .2 Temporary Work
  - .1 Structure as shown on Contract Documents is designed to withstand design loads only when structural elements are installed and fully connected. Analysis of components and assemblies under temporary configurations, including but not limited to stability, stresses, displacements, fabrication, shipping, handling, erection (at various stages), and construction loads, are sole responsibility of Contractor.
  - .2 Erection procedures and design of erection bracing and related provisions are sole responsibility of Contractor.
  - .3 Bracing members and anchor rod assemblies shown are for finished structure and may not be adequate to resist temporary forces during construction.
  - .4 Design erection bracing to safely resist dead loads, live loads, lateral loads, construction loads, and other loads imposed during construction.

- .5 Design erection bracing to limit inter-storey and total drift as required for construction purposes and ensure that inter-storey drift does not exceed  $h/400$  at floors where cladding has been installed.
- .6 During erection, forces or reaction in steel frame members and their connections might exceed those on which final or permanent building design is based. Determine magnitude of such erection forces and reactions and take such necessary measures to maintain safety and stability of structure during construction.

### 3.0 EXECUTION

#### 3.1 Fabrication

- .1 Fabrication shall confirm to requirements of CSA S16 and reviewed shop drawings.
- .2 Fabricated units shall be straight and true, without sharp kinks or bends, and accurate to sizes shown.
- .3 Flame cut steel columns shall have their ends milled. Steel base plates supporting columns shall be flat.
- .4 Prior to fabrication of structural steel, take field measurements where connections are to be made to existing work.
- .5 Modify installation methods and methods for connecting to suit site conditions encountered.
- .6 Unless noted otherwise, provide holes up to 12 mm (1/2") in diameter, as required, to permit attachment of other materials. Cross sectional area of section is not to be reduced by more than 10% at any point on its length.
- .7 Provide drain holes in closed sections to prevent water build-up during erection (or transportation).
- .8 Visually inspect plates and shapes for laminations. Repair plates or shapes that contain laminations in a manner approved by the Structural Engineer.
- .9 Splices
  - .1 Splices in members, other than those shown, that are provided for ease of fabrication or transportation are not permitted without Consultant approval.
    - .1 These connections to be designed to develop full strength and stiffness of member.
    - .2 Welded splices are to be subject to non-destructive testing as directed by Structural Engineer with cost of testing borne by Contractor.

- .3 Bolted splices shall be designed so slip is not permitted in connection assembly and to have same performance as a welded splice.
- .10 Openings
  - .1 No openings through structural steel members will be permitted without written approval of RJC.
- .11 Holes and Cutting
  - .1 Holes shall be drilled or punched at right angles to surface of metal, or CNC-guided plasma or flame-cut in accordance with CISC specifications. Burning holes will not be permitted.
  - .2 Provide holes in members to permit connections to work of other trades or contracts.
- .12 Bolts, Anchor Rods, and Embedded Parts
  - .1 Drive bolts accurately into holes without damaging threads and heads. Bolt heads and nuts shall rest squarely against metal surfaces.
  - .2 Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to bolt axis, provide beveled washers to give full bearing to thread or nut.
  - .3 Unless noted otherwise, install high strength bolts that are required to have full pretension using Turn-of-Nut Pretensioning, Twist-Off Type Tension Control Bolt Pretensioning, or Direct-Tension-Indicator (DTI) Pretensioning in accordance with "Specification for Structural Joints Using High-Strength Bolts". Use Calibrated Wrench Pretensioning only where specifically approved by RJC.
  - .4 Clean and re-lubricate bolts and nuts that become dry or rusty before use, except Tension Control bolts which must be re-lubricated by manufacturer.
  - .5 Label and ship anchor rods and base plates in sets indicating size and locations of columns and deliver in ample time prior to start of related concrete work. Furnish templates together with instructions for setting of anchor rods. Ascertain that anchor rods are set properly during progress of the Work.
  - .6 Label and ship other embedded parts, parts with welded couplers, and the like with locations and deliver in ample time prior to start of related concrete work. Furnish templates together with instructions for setting of embedded parts where applicable. Ascertain that embedded parts are set properly during progress of the Work.

.13 Welding of Structural Steel

.1 Pre-Weld Inspection

- .1 Surface to be welded and filler material to be used are subject to inspection by quality control personnel before welding is performed.

.2 Method and Type

- .1 Welding to be electric arc welding and comply with Codes and Specifications noted herein.

.14 Stiffeners

- .1 Provide welded stiffeners in girders, columns, and beams at points of concentrated loads where required by S16 or where specifically shown on Drawings. Grind fitted stiffeners to fit closely against bearing surfaces.

- .2 In locations of concentrated loads or bearing points shown on Drawings, fabricate these stiffeners to transfer full compressive capacity through top and bottom flange connection through end bearing, fabricated by CISC approved methods, or by welds where welds are designed to transfer this load.

- .15 Remove and replace, or repair (with Consultant approval) defective work. Such operation shall be at no extra charge to Owner.

### 3.2 Cleaning and Priming

- .1 Structural steel to have surface contamination (salts, oils, grease, drilling and cutting compounds), rust, and mill scale removed and an adequate surface profile provided in accordance with minimum surface preparation specified to reasonably match existing steel finish.

- .2 Surface preparation to be such that allows for matching of existing structure painted finish. Should product material data sheets require a more stringent level of surface preparation, this shall take precedence over following minimum requirements.

- .3 Apply primers in accordance with manufacturer's instructions.

- .4 Use paint prepared by manufacturer without thinning or adding admixtures. Execute painting on dry surfaces, free from rust, scale, or grease. Do not paint in temperatures lower than 8°C or as indicated within paint manufacturer's specification and application procedures.

- .5 Submit proposed primer and paint products for Consultant and Owner review prior to commencing any work. Colour, sheen, durability to match existing.

### 3.3 Erection

- .1 Structural steel to be assembled and erected in accordance with approved erection drawings and specified reference Standards.
- .2 Erector is fully responsible for erection methods, equipment, workmanship, and safety precautions.
- .3 Confirm setting of anchor rods and bearing plates and make an instrument survey to verify setting prior to erection of steel members.
- .4 Cutting or burning of baseplates to accommodate anchor rods are cause for rejection of baseplates. Costs associated with replacement or remedial work cause by field modifications of baseplates are Contractor's responsibility.
- .5 Adequately distribute construction loads due to temporary storage of materials, erection equipment, or other loads during construction phase to not exceed capacity of structure.
- .6 Proper fit up of members in compression is critical to correctly load members. Tolerance for joint fit up to be in accordance with CSA S16, clause 28.5 Joints in Contact Bearing.
- .7 Remove temporary bolts, clips, angles, etc. used to facilitate erection unless noted otherwise on Drawings.
  - .1 Splices: Fastening of splices of compression members to be done after abutting surfaces have been brought completely into contact. Splices will be permitted only where indicated on Contract Drawings or reviewed shop drawings.
  - .2 Errors: Report errors in shop fabrication or deformations resulting from handling and transportation that prevent proper assembly and fitting of parts or in erection operation. Make suggestions for corrective work and obtain approval of method of correction. Costs of corrective work are Contractor's responsibility.
- .8 Plumb, level, and align individual members of steel work as specified in CSA S16.

### 3.4 Welding

- .1 Welding to be shielded metal-arc method in accordance with requirements CSA W59. Welding operators to be currently certified under CSA W47.1 for work they are performing.
- .2 Submit, when requested, welding procedures prepared and sealed by a Specialty Structural Engineer for review.

- .3 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, clean each layer before depositing next layer. Take care to minimize stresses due to heat expansion, contraction, and distortion by using proper sequence in welding and by approved methods.
- .4 Appearance, quality of welds made, and methods of correcting defective work shall be in accordance with CSA W59.
- .5 Welding of reinforcing bars to structural steel per CSA W186.

### **3.5 Completion**

- .1 Specialty Structural Engineer responsible for sealed shop drawings or their representative shall visit site to review in place connections and components designed by that Specialty Structural Engineer to verify substantial compliance with their sealed shop drawings. They shall then submit signed and sealed schedule C-3 to Consultant and Structural Engineer.
- .2 On completion of work of this Section, remove temporary works, surplus materials, debris, tools, plant, and equipment from site.

**END OF SECTION**