

PART 1 - GENERAL

1.1 REFERENCES

- .1 ASTM A307-07a, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .2 ASTM A325-2010, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 ASTM A572/A 572M-2012a, Specification for High-Strength Low Alloy Columbium-Vanadium Structural Steel.
- .4 ASTM A123/A123M-2012, Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
- .5 ASTM A449-2010, Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use.
- .6 ASTM A153/A153M-09, Standard Specification for Zinc (Hot-Dip) Coatings on Iron and Steel Hardware.
- .7 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.
- .8 CAN/CSA-S16-09, Consolidation, Design of Steel Structures.
- .9 CSA W47.1-2009, Certification of Companies for Fusion Welding of Steel.
- .10 CSA W55.3-2008, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .11 CSA W59-2013, Welded Steel Construction (Metal Arc Welding).
- .12 CISC/CPMA 2-75, Quick-Drying, Primer for use on Structural Steel.
- .13 CISC/CPMA Standard 1-73a, Quick Drying, One Coat Paint for Use on Structural Steel.

<u>1.1 REFERENCES (Cont'd)</u>	.14	ASTM A500/A500M-2010, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
<u>1.2 SOURCE QUALITY CONTROL</u>	.1	Prior to commencing work, submit two (2) certified copies of mill reports covering chemical and physical properties of steel used in this work.
<u>1.3 DESIGN OF DETAILS AND CONNECTIONS</u>	.1	Design and detail connections in accordance with requirements of CAN/CSA-S16.1 and also to resist forces, moments and shears where indicated.
	.2	Where connection forces are not indicated, the connection shall be detailed to resist 50% of the total uniformly distributed factored load capacity of the members, and 75% of tensile capacity of bracing members.
	.3	For non-standard connections, submit sketches and design calculations stamped and signed by a qualified professional engineer registered in the Province of Nova Scotia.
	.4	For standard connections, select details from CISC Handbook of Steel Construction to ensure structural adequacy. Submit all standard connections for each structural steel member size. Connections shall be stamped and signed by a qualified professional engineer registered in the province of Nova Scotia.
	.5	Submit all connection designs and sketches as connections are available to review in order to expedite the review process.
<u>1.4 SHOP DRAWINGS</u>	.1	Submit connection details and erection drawings in accordance with Section 01 33 00.
	.2	On erection drawings, indicate member size, base plate elevation, anchor bolt size and location and information necessary for assembly.
	.3	Submit shop details of all standard connections and non-standard connections to be

- 1.4 SHOP DRAWINGS (Cont'd)
- .3 (Cont'd)  
used in the connection of structural steel members. Identify on erection drawings the location of all non-standard connections.
  - .4 All submitted drawings to bear signature and seal of professional engineer registered in Province of Nova Scotia for all fabricator designed assemblies, components and connections.
  - .5 Indicate welds by welding symbols as defined in CSA W59.

## PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Structural steel: to CAN/CSA- G40.21 (Grade 345 MPa) and ASTM-A572 (Grade 350W) for columns and beams, Grade 300 W for angles, plates and channels, CAN/CSA G40.21 (Grade 250W) for bars, CAN/CSA- G40.21 (Grade 350W) and/or ASTM A500 (Grade 345 MPa), Class C for hollow structural sections.
  - .2 Anchor bolts: to ASTM A307 and to ASTM A449.
  - .3 Chemical anchors: diameter and embedment as noted on the Project Drawings. If embedment is not noted provide the standard embedment as noted by the manufacturer. Install anchors as per the manufacturer's recommendations. Manufacturer's representative to provide training to the installer regarding proper installation.
    - .1 Acceptable Products:
      - .1 Hilti HIY HI150 - Max Chemical Adhesive complete with Hilti HAS-E rods.
      - .2 AC100 Chemical Adhesive by Powers Fasteners complete with A307 threaded rod.
      - .3 Set Epoxy by Simpson Strongtie complete with A307 threaded rod.
  - .4 Expansion Anchors: diameter and embedment as noted on the Project Drawings. If embedment is not noted provide the standard embedment as noted by the manufacturer. Install anchors as per the manufacturer's recommendations. Manufacturer's representative to provide

2.1 MATERIALS  
(Cont'd)

- .4 Expansion Anchors:(Cont'd)  
training to the installer regarding proper  
installation.
  - .1 Acceptable Products:
    - .1 Kwik Bolt 3 by Hilti
    - .2 Hex Head Power Bolt by Power  
Fasteners
    - .3 Wedge, all by Simpson Strongtie
  - .5 Bolts, nuts and washers: to ASTM A325.
  - .6 Welding materials: to CSA W59 and certified  
by Canadian Welding Bureau.
  - .7 Shop paint primer: to CISC/CPMA 2.
  - .8 Galvanizing: Hot-dip method with minimum zinc  
coating of 600 g/m<sup>2</sup> conforming to ASTM A123/  
A123M and ASTM A153/A153M.

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with  
CAN/CSA-S16.1 and in accordance with reviewed  
shop drawings.
- .2 Continuously weld connection joints of  
architecturally exposed steel and grind smooth  
and flush with adjacent surfaces.
- .3 Provide holes for attachment of other work  
only when and where approved by the  
Departmental Representative or as shown on the  
drawings.
- .4 Provide bearing plates with anchor bolts for  
steel beams unless otherwise indicated.
- .5 Where finished surfaces of steel are to be  
left exposed to view, fabricate to AISC  
specifications for architecturally exposed  
steel including straightness.
- .6 Remove mill marks, identification and surface  
imperfections of exposed steel by grinding  
smooth and flush with adjacent surfaces.
- .7 Exposed welds to be continuous for length of  
each joint. File or grind exposed welds smooth  
and flush.

- 2.3 SHOP PAINTING .1 For locations where steel is to be top coated with an architectural paint, steel is to be primed as per CAN CISC/CPMA 2-75. All other steel is to be primed with CAN CISC/CPMA 1-73a except where members are to be field welded, are in contact at bolted friction type connections or are to be encased in concrete where no primer is required. For locations where an architectural top coat is required refer to architectural drawings.

PART 3 - EXECUTION

- 3.1 GENERAL .1 Do welding in accordance with CSA W59.
- .2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.
- .3 When requested by Departmental Representative, provide certification that all welded joints are qualified by the Canadian Welding Bureau.

- 3.2 MARKING .1 Mark materials in accordance with CSA-G40.20. Do not use die stamping. If steel is to be left in unpainted condition, place marking at locations not visible from exterior after erection.
- .2 Match marking: shop mark for fit and match.

- 3.3 ERECTION .1 Erect structural steel, as indicated and in accordance with CAN/CSA- S16.1 and in accordance with reviewed erection drawings.
- .2 Verify dimensions and conditions of existing work before commencing fabrication and report discrepancies or problems to the Departmental Representative. Do not proceed until notified by Departmental Representative.
- .3 Obtain written permission of Departmental Representative prior to field cutting or altering of structural members.

3.3 ERECTION  
(Cont'd)

- .4 Clean with mechanical brush and touch up shop primer to bolts, welds and burned or scratched surfaces at completion of erection.
- .5 Assume full responsibility for the integrity of structure during erection. Make necessary provision for all erection loads and for sufficient temporary bracing to maintain structure safe, plumb and in true alignment until completion of erection and installation of necessary permanent bracing and frames.
- .6 Set column base plates and loose bearing plates with steel shims to proper elevation, true and level, ready for grouting-in.
- .7 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes and without distorting, kinking or sharply bending metal of any unit. If, in the opinion of the Departmental Representative, holes must be enlarged to admit bolts, they are to be reamed and larger size bolts used. Reamed holes not to exceed size of bolt used by more than 2mm.

3.4 FIELD QUALITY  
CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Departmental Representative.
- .2 Testing laboratory may use ultra-sonic testing procedures to verify soundness of some representative shop and field welds. In principal structural members, shop and field welds will be X-rayed. Representative bolted connections will be checked with torque wrench. Departmental Representative will determine location and extent of all testing.

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management System.
- .3 Section 03 30 00 - Cast-in-Place Concrete.
- .4 Section 04 05 19 - Masonry Anchorage and Reinforcing.
- .5 Section 04 05 00 - Common Work Results for Masonry.
- .6 Section 05 51 29 - Metal Stairs and Ladders.
- .7 Section 09 91 23 - Interior Painting.

### 1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
  - .1 ASTM A 53/A53M-07, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2 ASTM A 307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
  - .2 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16-09, Limit States Design of Steel Structures.
  - .4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

1.2 REFERENCES	.3	(Cont'd)
(Cont'd)	.5	CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding) (Imperial Version).
	.4	The Environmental Choice Program
	.1	CCD-047a-98, Paints, Surface Coatings.
	.2	CCD-048-98, Surface Coatings - Recycled Water-borne.
1.3 SUBMITTALS	.1	Product Data:
	.1	Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
	.1	For finishes, coatings, primers and paints.
	.2	Shop Drawings
	.1	Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
	.3	Shop drawings to be stamped and signed by Professional Engineer licensed to practice in the Province of Nova Scotia.
1.4 QUALITY ASSURANCE	.1	Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
	.2	Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
1.5 DELIVERY, STORAGE AND HANDLING	.1	Packing, Shipping, Handling and Unloading:
	.1	Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.



#### 1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management System.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A 53/A53M-07, extra strong, black finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A 307.
- .6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

#### 2.2 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m<sup>2</sup> to CAN/CSA-G164, passivated.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .4 Bituminous paint: to CAN/CGSB-1.108.

2.4 ISOLATION  
COATING

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.

2.5 SHOP PAINTING

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C.
- .3 Clean surfaces to be field welded; do not paint.

2.6 SCHEDULE OF  
ITEMS

- .1 Miscellaneous metal fabrication items include, but are not limited to, the following:
  - .1 Angle framing for vanity supports, as indicated. Notch ends of angles to ensure top surfaces of angles to receive vanity are all flush. Drill holes at 200 mm o.c. for attachment of vanity and front apron by section 06 40 00. Hot dipped galvanized.
  - .2 Railings and guards in stairs and other locations, as indicated. Shop coat primed.

### PART 3 - EXECUTION

#### 3.1 ERECTION

- .1 Do welding work in accordance with CSA W59-03(R2008) unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1-94(R2000), or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding or damaged during erection.

#### 3.2 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

## PART 1 - GENERAL

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| <u>1.1 RELATED SECTIONS</u> | .1 | Section 03 30 00 - Cast-in-Place Concrete.          |
|                             | .2 | Section 04 05 00 - Common Work Results for Masonry. |
|                             | .3 | Section 05 50 00 - Metal Fabrications.              |
|                             | .4 | Section 09 91 23 - Interior Painting.               |

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| <u>1.2 REFERENCES</u> | .1 | American Society for Testing and Materials International, (ASTM)  |
|                       | .1 | ASTM A53/A53M-10, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.       |
|                       | .2 | ASTM A307-10, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.                    |
|                       | .3 | ASTM A325M-09, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. |
|                       | .2 | Canadian General Standards Board (CGSB)   |
|                       | .1 | CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.   |
|                       | .2 | CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.   |
|                       | .3 | CSA G40.20-04/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel.           |
|                       | .4 | CAN/CSA G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.                                 |
|                       | .3 | Canadian Standards Association (CSA International)  |
|                       | .1 | CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding/Imperial Version).                            |
|                       | .4 | National Association of Architectural Metal Manufacturers (NAAMM)   |
|                       | .1 | AMP 510-92, Metal Stair Manual.   |
|                       | .5 | Steel Structures Painting Council (SSPC), Systems and Specifications Manual, Volume 2.                        |

1.3 SYSTEM DESCRIPTION	.1	Design Requirements: .1 Design metal stair and landing construction and connections to NBC vertical and horizontal live load requirements. .2 Detail and fabricate stairs to NAAMM Metal Stairs Manual.
1.4 SUBMITTALS	.1	Product Data: .1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs: .1 For finishes, coatings, primers and paints.
	.2	Shop Drawings .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures. .2 Indicate construction details, sizes of steel sections, thickness of steel sheet, finishes, joints, methods of anchorage, number of anchors, supports, reinforcement, details and accessories. .3 Submit shop drawing bearing stamp of a qualified professional engineer registered in Province of Nova Scotia.
1.5 QUALITY ASSURANCE	.1	Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
	.2	Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
1.6 WASTE MANAGEMENT AND DISPOSAL	.1	Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management System.
	.2	Remove from site and dispose of packaging materials at appropriate recycling facilities.
	.3	Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard

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| 1.6 WASTE<br>MANAGEMENT AND<br>DISPOSAL<br>(Cont'd) | .3 | (Cont'd)<br>packaging material for recycling in accordance<br>with Waste Management Plan.                              |
|   | .4 | Divert unused metal materials from landfill<br>to metal recycling facility approved by<br>Departmental Representative. |

## PART 2 - PRODUCTS

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|-----------------|----|---|
| 2.1 MATERIALS   | .1 | Steel sections: to CSA G40.20/G40.21 Grade<br>350 W.  |
|                 | .2 | Steel plate: to CSA G40.20/G40.21, Grade 300<br>W.  |
|                 | .3 | Steel pipe: to ASTM A 53/A 53M, standard<br>weight, schedule 40 seamless black.   |
|                 | .4 | Steel tubing: to CSA G40.20/G40.21, wall<br>thickness, sizes and dimensions as indicated.   |
|                 | .5 | Welding materials: to CSA W59.  |
|                 | .6 | Bolts: to ASTM A 307.   |
|                 | .7 | High strength bolts: to ASTM A 325M.  |
| 2.2 FABRICATION | .1 | Fabricate to NAAMM, Metal Stair Manual.   |
|                 | .2 | Weld connections where possible, otherwise<br>bolt connections. Countersink exposed<br>fastenings, cut off bolts flush with nuts.<br>Make exposed connections of same material,<br>colour and finish as base material on which<br>they occur. |
|                 | .3 | Accurately form connections with exposed<br>faces flush; mitres and joints tight. Make<br>risers of equal height.   |
|                 | .4 | Grind or file exposed welds and steel<br>sections smooth.   |
|                 | .5 | Shop fabricate stairs in sections as large<br>and complete as practicable.  |

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| <u>2.3 STEEL PAN STAIRS</u> | <ul style="list-style-type: none"><li>.1 Design and fabricate stair with steel pan construction at location indicated on drawing.</li><li>.2 Fabricate using 3mm thick steel plate. Secure treads and risers to L 35 x 55 x 6 angles, horizontal and vertical, welded to stringers.</li><li>.3 Form wall stringers from C 310 x 15.87.</li><li>.4 Form outer stringers from C 310 x 15.8.</li><li>.5 Close ends of stringers where exposed with 6mm steel plate paint.</li><li>.6 Treads to be concrete filled. Landing to be constructed as per drawings.</li><li>.7 Prime paint where not filled with concrete.</li></ul> |
| <br>                        |   |
| <u>2.4 LADDERS</u>          | <ul style="list-style-type: none"><li>.1 Recessed elevator pit ladder. Design and fabricate as per drawings. Ladder to be hot dipped galvanized.</li></ul>  |
| <br>                        |   |
| <u>2.5 FINISHES</u>         | <ul style="list-style-type: none"><li>.1 Shop coat primer: to CAN/CGSB-1.40.</li><li>.2 Paint all exposed steel components.</li></ul>   |
| <br>                        |   |
| <u>2.6 SHOP PAINTING</u>    | <ul style="list-style-type: none"><li>.1 Clean surfaces in accordance with Steel Structures Painting Council Manual Volume 2.</li><li>.2 Apply one coat of shop primer except interior surfaces of pans.</li><li>.3 Apply two coats of primer of different colours to parts inaccessible after final assembly.</li><li>.4 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7 degrees C.</li><li>.5 Do not paint surfaces to be field welded.</li></ul>  |
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PART 3 - EXECUTION

3.1 INSTALLATION  
OF STAIRS

- .1 Install in accordance with NAAMM, Metal Stair Manual.
- .2 Install plumb and true in exact locations, using welded connections wherever possible to provide rigid structure. Provide anchor bolts, bolts and plates for connecting stairs to structure.
- .3 Do welding work in accordance with CSA W59-03(R2008) unless specified otherwise.
- .4 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.
- .5 Touch up galvanizing damaged during erection or burned by field welding with zinc rich primer.

3.2 CLEANING

- .1 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.