

**RETURN BIDS TO:**  
**RETOURNER LES SOUMISSIONS À:**  
**Public Works Government Services Canada- Bid**  
**Receiving / Réception des soumissions**  
**189 Prince William Street**  
**Room 421**  
**Saint John**  
**New Brunswick**  
**E2L 2B9**

## **SOLICITATION AMENDMENT MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

### **Comments - Commentaires**

**Vendor/Firm Name and Address**  
**Raison sociale et adresse du**  
**fournisseur/de l'entrepreneur**

**Issuing Office - Bureau de distribution**  
**Public Works Government Services Canada- Bid**  
**Receiving / Réception des soumissions**  
**189 Prince William Street**  
**Room 421**  
**Saint John**  
**New Bruns**  
**E2L 2B9**

<b>Title - Sujet</b> Const.4 Bed Sle Exp,Nova Ins,Truro	
<b>Solicitation No. - N° de l'invitation</b> EC016-123366/A	<b>Amendment No. - N° modif.</b> 009
<b>Client Reference No. - N° de référence du client</b> R.043928.004	<b>Date</b> 2012-05-23
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$PWB-020-3071	
<b>File No. - N° de dossier</b> PWB-2-35001 (020)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2012-05-31</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Atlantic Daylight Saving Time ADT
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Donovan, Janine PWB	<b>Buyer Id - Id de l'acheteur</b> pwb020
<b>Telephone No. - N° de téléphone</b> (506) 636-5347 ( )	<b>FAX No. - N° de FAX</b> (506) 636-4376
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

Cette modification de l'invitation numéro 9 est soumise et comprend la modification numéro 9 suivante.

La modification qui suit apportée aux documents de soumission entre en vigueur dès maintenant. L'addenda fera partie des documents de contrat. **Toutes autres conditions ne changent pas.**

## **Modification numéro 9**

### **1. DEVIS**

**REMOVE** Section 03 10 00 Concrete Formwork and **REPLACE WITH** Section 03 10 00 Concrete Formwork Revision 1, 16.05.2012 attached.

**REMOVE** Section 03 20 00 Concrete Reinforcement and **REPLACE WITH** Section 03 20 00 Concrete Reinforcement Revision 1, 16.05.2012 attached.

**REMOVE** Section 03 30 00 - Cast-In-Place Concrete and **REPLACE WITH** Section 03 30 00 Cast-In-Place Concrete Revision 3, 16.05.2012 attached.

**REMOVE** Section 05 12 23 - Structural Steel and **REPLACE WITH** Section 05 12 23 Structural Steel Revision 1, 16.05.2012 attached.

**REMOVE** Section 05 31 00 - Metal Deck and **REPLACE WITH** Section 05 31 00 Metal Deck Revision 1, 16.05.2012 attached.

**DELETE** Section 06 17 53 - Shop Fabricated Wood Trusses in its entirety.

**REMOVE** Section 99 99 98 - List of Drawings and **REPLACE WITH** Section 99 99 98 - List of Drawings Revision 1, 16.05.2012 attached.

**REMOVE** Section 99 99 99 - List of Contents and **REPLACE WITH** Section 99 99 99 - List of Contents Revision 1, 16.05.2012.

**Section 08 50 00, DELETE** subsection 2.2.1.1.1 and 2.2.1.2.1 in their entirety.

### **2. DESSINS**

**ADD** Structural Drawing S-1 Foundation Plan and Sections attached as ATT 7 (DSP Eng.).

**ADD** Structural Drawing S-2 Roof Framing Plan and Sections attached as ATT 8 (DSP Eng.).

**ADD** Structural Drawing S-3 Typical Details and Notes attached as ATT 9 (DSP Eng.).

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**REMOVE** SLE-A2 Foundation Plan & Legends and **REPLACE WITH** A-2 Foundation Plan & Legends Revision 6 attached as ATT 10 (DSP Eng.).

**REMOVE** SLE-A3 First Floor Plan and **REPLACE WITH** SLE-A3 First Floor Plan Revision 6 attached as ATT 11 (DSP Eng.).

**REMOVE** SLE-A6 Wall Sections and **REPLACE WITH** SLE-A6 Wall Sections Revision 6 attached as ATT 12 (DSP Eng.).

**REMOVE** SLE-A7 SLE Expansion Plan Details and **REPLACE WITH** SLE-A7 SLE Expansion Plan Details Revision 6 attached as ATT 13 (DSP Eng.).

**REMOVE** SLE-A8 Section Details and **REPLACE WITH** SLE-A8 Section Details Revision 6 attached as ATT 14 (DSP Eng.).

**REMOVE** SLE-A9 Floor & Ceiling Finishing Plans and **REPLACE WITH** SLE-A9 Floor & Ceiling Finishing Plans Revision 5 attached as ATT 15 (DSP Eng.).

**REMOVE C-1** - Servicing plan & profile and **REPLACE WITH C-1** Servicing plan & profile, Revision 3, dated May 18, 2012 attached as ATT 16 (DSP Eng.). The proposed fire hydrant and hydrant lead, including water valve, WV4 have been deleted. Three water laterals have been deleted, which includes water valves, WV5, WV6 and WV7. Two proposed drainage ditches (18.2 m and 15.3 m long) have been deleted. The existing rock-lined drainage ditch is to remain. All proposed reshaping of existing drainage ditches has been removed.

**REMOVE C-2** - Grading Plan and **REPLACE WITH C-2** Grading Plan, Revision 3, dated May 18, 2012 attached as ATT 17 (DSP Eng.). All references to the proposed fire hydrant, WV4, WV5, WV6 and WV7 have been deleted. Two proposed drainage ditches (18.2 m and 15.3 m long) have been deleted. The existing rock-lined drainage ditch is to remain. All proposed reshaping of existing drainage ditches has been removed.

**REMOVE C-3** - Storm Drainage, Erosion and Sedimentation Control Plan and **REPLACE WITH** Storm Drainage, Erosion and Sedimentation Control Plan, Revision 3, dated May 18, 2012 attached as ATT 18 (DSP Eng.). All references to the proposed fire hydrant, WV4, WV5, WV6 and WV7 have been deleted. Two proposed drainage ditches (18.2 m and 15.3 m long) have been deleted. The existing rock-lined drainage ditch is to remain.

**REMOVE C-4** - Finished Surface and **REPLACE WITH C-4** - Finished Surface Revision 3, dated May 18, 2012 attached as ATT 19 (DSP Eng.). All references to the proposed fire hydrant, WV4, WV5, WV6 and WV7 have been deleted. Two proposed drainage ditches (18.2 m and 15.3 m long) have been deleted. The existing rock-lined drainage ditch is to remain.

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**REMOVE C-5 - Construction Details and REPLACE WITH C-5 Construction Details,** Revision 3, dated May 18, 2012 attached as ATT 20 (DSP Eng.). Detail I - Typical Hydrant Installation. Detail has been deleted.

### **3. QUESTIONS ET RÉPONSES**

**Q1:** Section 32 98 00 Reinstatement page 2, Part 3.3 indicates a different procedure for patching asphalt than that indicated on F / C-5, please confirm which is required.

**R1:** In response to item #1, both 2 x 50mm TOK reinstatement tape and tack coat should be used.

**Q2:** Is the testing of concrete, Section 03 30 00 page 7, Part 3.4 to be paid for by the contractor?

**R2:** Yes, all testing is to be at no additional cost to the contract as per section 3.4.2.

**Q3:** SLE - A9 does not indicate any bulkheads in the existing bedrooms, however they appear to be indicated on the A3 Floor plan. Please confirm.

**R3:** The finishes drawing SLE A-9 has been amended to show the bulkheads required in the existing bedrooms and also new bulkheads required to clear the new steel structure. Drawing SLE A-9 is part of the revised architectural drawings being sent out as part of the addendum for the roof trusses

**Q4:** Section 01 50 00 Temporary Facilities, page 1, Part 1.5 Site. Please indicate the areas required to be enclosed.

**R4:** Enclosed area will be determine once contractor is on-site.

**Q5:** Drawing E1, are the conduits in shown in sections A, B and C to enter the buildings below grade or can the conduits be installed on the exterior before entering the buildings?

**R5:** Conduits entering the main control centre post building should be below grade. Conduits going to main electrical room in main bldg. will be mounted on outside wall of building and then run overhead in ceiling space to elect room. 27mm conduit to maintenance building to enter above grade as low as possible.

**Q6:** Drawing E1, are the requirements for the installation of the 27 mm conduit similar to that indicated on Section A, B and C?

Solicitation No. - N° de l'invitation

EC016-123366/A

Client Ref. No. - N° de réf. du client

R.043928.004

Amd. No. - N° de la modif.

009

File No. - N° du dossier

PWB-2-35001

Buyer ID - Id de l'acheteur

pwb020

CCC No./N° CCC - FMS No/ N° VME

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**R6:** The requirement for 27mm conduit to maintenance bldg. shall be similar to sections a, b, c.

## PART 1 - GENERAL

### 1.1 RELATED WORK

- .1 Section 03 20 00 - Concrete Reinforcement
- .2 Section 03 30 00 - Cast-In-Place Concrete

### 1.2 REFERENCES

- .1 CAN/CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA O86-09, Consolidation, Engineering Design in Wood.
- .3 CSA O121-08, Douglas Fir Plywood.
- .4 CSA O153-M1980 (R2008), Poplar Plywood.
- .5 CSA O437 SERIES-93 (R2011) - Standards on OSB and Waferboard.
- .6 CSA S269.1-1975 (R2003), Falsework for Construction Purposes
- .7 CSA S269.3-M92 (R2008), Concrete Formwork.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CSA-O86, CSA O437 Series and CSA-O153.
  - .2 For concrete with special architectural features, use formwork materials to CSA-A23.1.
  - .3 Form ties:
    - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
    - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs
  - .4 Form release agent:
    - .1 Chemically active, non-staining, release agents containing compounds that react with free lime in concrete resulting in water insoluble soaps. Non-toxic, biodegradable, low VOC.
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- .5 Form stripping agent:
  - .1 Colourless, non-staining, mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110 s Saybolt Universal at 40 degrees C, and having a minimum flashpoint of 150 degrees C. Form release agents must be compatible with waterproofing systems where applicable.
- .6 Falsework materials: to CSA-S269.1.

### PART 3 - EXECUTION

#### 3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Consultant's approval for use of earth forms and for framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Refer to architectural drawings for concrete members requiring architectural exposed finishes.
- .6 Do not place shores and mud sills on frozen ground.
- .7 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .8 Fabricate and erect formwork in accordance with CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1.
- .9 Align form joints and make watertight. Keep form joints to minimum.
- .10 Locate horizontal form joints in exposed columns and walls 2400 mm above finished floor elevation.
- .11 Use 25 mm chamfer strips on exterior corners and 25 mm fillets at interior corners unless specified otherwise.
- .12 Form all chases, slots, openings, drips, recesses, expansion and control joints. Also form pockets in concrete walls for cladding anchorage as required.
- .13 Build in anchors, inserts, sleeves, miscellaneous frames, flashing reglets, weather bars, holes, and other inserts required to accommodate work of other sections. This includes all embedded items as required to support cladding elements and structural steel framing

support. Assure that all anchors and inserts will not protrude beyond surfaces designated to receive applied finishes.

- .14 Clean formwork in accordance with CSA-A23.1, before placing concrete.
- .15 Construct forms for surfaces to receive membrane type waterproofing with taped joints and edges of plywood backed to prevent separation
- .16 Construction Joints:
  - .1 Form construction joints where required and as approved by the Departmental Representative.
  - .2 Additional reinforcing steel resulting from splicing reinforcing bars, etc. as required to form construction joints in walls, slabs, etc. will be provided at no cost to the Contract.
- .17 Waterstops:
  - .1 Build waterstops into forms. Support against displacement by pouring of concrete. Locate waterstops at construction joints in pits and trenches below floor levels, and as indicated on Drawings.
  - .2 Use preformed waterstop corners and intersections where they are available to suit conditions.
  - .3 Join waterstops to preformed corners and intersections, and between lengths with butted and welded connections in accordance with manufacturer's recommendations.
- .18 Holes Cast into Concrete During Construction:
  - .1 Install all sleeves, ducts, pipes, and other openings.
  - .2 No sleeves, ducts, pipes or other openings shall pass through beams or column except where indicated or approved by Departmental Representative.
  - .3 Ensure that where sleeves or pipes pass through slabs and walls they are fabricated of PVC, cast iron or galvanized steel. Sleeves shall not be spaced closer than three diameters on centre from adjacent sleeves unless approved by Departmental Representative.
  - .4 Where approved by Departmental Representative, set sleeves and openings as indicated or specified elsewhere. Provided they are shown on structural drawings, sleeves, pipes or openings, that are not greater than 450 mm square, or 450 mm in diameter, may pass through walls and slabs provided that no more than two reinforcing bars are interrupted and additional reinforcing steel is incorporated as per details on structural drawings. Contact Departmental Representative before installing any openings greater than 150 mm x 150 mm or 150 mm diameter that are not shown on structural drawings.
  - .5 Check locations and sizes of sleeves and openings shown on drawings.

### 3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete:
  - .1 3 days for walls and sides of beams and columns.
  - .2 28 days for beam soffits, slabs, decks and other structural members, or 7 days



- when replaced immediately with adequate shoring to standard specified for falsework.
- .3 2 days for footings and abutments.
- .2 Be responsible for the safety of the structure, both before and after removal of the forms, until concrete has reached its specified 28 day strength.
- .3 Strip formwork only when no damage will result from the stripping.
- .4 Take care in removing plywood forms. Do not jerk them loose or use metal pinch bars, but use wood wedges and gradually force the panels loose. Leave plywood forms in place as long as possible and until other adjacent formwork is stripped to permit maximum shrinkage away from concrete and to protect surfaces. Take particular care to prevent damage to external corners of concrete.
- .5 Provide all necessary re-shoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .6 Re-use formwork and falsework subject to requirements of CSA-A23.1.
- .7 Movement and displacement of formwork during construction, variations in excess of specified tolerances, and marked and disfigured surfaces that cannot be repaired by methods acceptable to structural consultant will be considered defective Work performed by the Section.
- .8 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no cost to the Contract.

### 3.3 QUALITY OF FORMWORK

- .1 Particular attention must be paid to the quality of all concrete exposed to view upon completion of the project including retaining walls. In exposed surfaces, form ties must be minimal, regular and neat and be plugged properly upon removal of formwork.
- .2 For the above-mentioned elements the following special precautions must be taken:
- .1 All plywood form panels should be new at the start of this project.
- .2 Concrete shall be smooth form finish as described in CSA A23.1
- .3 Take special care in vibrating concrete in these elements.
- .4 All joints in formwork, both horizontally and vertically must be aligned.
- .3 Any concrete falling short of these requirements shall be removed and replaced at no cost to the Contract.

END

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PART 1 - GENERAL

1.1 RELATED WORK

- .1 Section 03 10 00 - Concrete Formwork
- .2 Section 03 30 00 - Cast-In-Place Concrete

1.2 REFERENCES

- .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA A23.3-04 (R2010), Design of Concrete Structures
- .3 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
- .4 CSA G40.20-04/G40.21-04 (R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .5 ASTM A123-09/A123M-09, Zinc (Hot Dip Galvanized) Coatings and Iron and Steel Products
- .6 CSA W186-M1990 (R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .7 ASTM A185/A185M-07, Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- .8 ASTM A775-07b/A775M-07b, Specification for Epoxy Coated Steel Reinforcing Bars
- .9 Reinforcing Steel Institute of Canada (RSIC) Manual Standard of Practice (2004 with 2010 cards)

1.3 SHOP DRAWINGS

- .1 Submit shop drawings including placing of reinforcement in accordance with Section 01 33 00 – Submittal Procedures.
  - .2 Indicate on shop drawings, bar bending details, lists, quantities of reinforcement, sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings. Indicate sizes, spacings and locations of chairs, spacers and hangers. Prepare reinforcement drawings in accordance with Reinforcing Steel Manual of Standard Practice - by Reinforcing Steel Institute of Canada.
  - .3 Detail lap lengths and bar development lengths to CSA A23.3, unless otherwise indicated.
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Provide Type B tension lap splices to CSA A23.3 unless otherwise indicated.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel: weldable low alloy steel deformed bars to CAN/CSA-G30.18.
- .4 Welded steel wire fabric: to ASTM A185. Provide in flat sheets only.
- .5 Epoxy Coating of non-prestressed reinforcement: to ASTM A775.
- .6 Galvanizing of non-prestressed reinforcement: to ASTM A123.
- .7 Chairs, bolsters, bar supports, spacers to CSA-A23.1.
- .8 Mechanical splices: subject to approval of Departmental Representative.
- .9 Plain round bars: to CSA-G40.21.

### 2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada unless indicated otherwise.
- .2 Obtain Departmental Representative's approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

### 2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, prior to commencing reinforcing work.

### PART 3 - EXECUTION

#### 3.1 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

#### 3.2 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on reviewed placing drawings and in accordance with CSA-A23.1.
- .2 Use plain round bars as slip dowels in concrete. Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint. When paint is dry, apply a thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative 's approval of reinforcing material and placement. Give Departmental Representative 24 hours notice.
- .4 Use chairs to support all reinforcing steel to ensure proper positioning and that cover to reinforcement is maintained during concrete pour. Chairs must also be used to support reinforcing steel in slabs on grade and footings.

END

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PART 1 - GENERAL

1.1 RELATED WORK

- .1 Section 03 10 00 - Concrete Formwork
- .2 Section 03 20 00 - Concrete Reinforcement
- .3 Section 32 16 15 - Concrete Walks, Curbs & Gutters
- .4 Section 33 05 16 - Manholes & Catch Basin Structures

1.2 REFERENCES

- .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004, and A3005).
- .3 ASTM C260/C260M 10a, Specification for Air-Entraining Admixtures for Concrete.
- .4 ASTM C494 / C494M - 11 Standard Specification for Chemical Admixtures for Concrete.
- .5 NOT USED
- .6 CAN/CGSB 51.34-M86AMEND, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .7 ASTM D412-06ae2, Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension
- .8 ASTM D624-00 (2007), Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- .9 ASTM D1751 - 04(2008) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- .10 ASTM D2240-05 (2010), Test Method for Rubber Property-Durometer Hardness
- .11 ASTM C309-11, Specification for Liquid Membrane-Forming Compounds for Curing Concrete

1.3 CERTIFICATES

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- .1 Submit certificates in accordance with Section 01 33 00.
- .2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1.
- .3 Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1. Ready-mix Plant must be a member of the Atlantic Provinces Ready Mixed Concrete Association and must hold a current "Certificate of Ready Mixed Concrete Production Facilities" as issued by the Association.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Portland cement with fly ash replacement: to CSA-3000.
- .2 Supplementary cementing materials: to CSA-A3000.
- .3 Water: to CSA-A23.1.
- .4 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density.
- .5 Air entraining admixture: to ASTM C260.
- .6 Chemical admixtures: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Concrete retarders: to ASTM C494 low VOC, solvent free.
- .8 Shrinkage compensating grout: premixed compound consisting of aggregate, cement, water reducing and plasticizing agents. Compressive strength: 55 MPa psi at 28 days.
- .9 Ribbed waterstops: extruded PVC Arctic Grade with shop welded corner and intersecting pieces:
  - .1 Tensile strength: to ASTM D412, method A, Die "C", minimum 11 MPa.
  - .2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.
  - .3 Tear resistance: to ASTM D624, method A, Die "B", minimum 44 kN/m.
- .10 Premoulded joint fillers:
  - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .11 Weep hole tubes: plastic.
- .12 Dampproof membrane:
  - .1 0.25 mm polyethylene film to CAN/CGSB-51.34
- .13 Dampproofing:

- .1 Emulsified asphalt, mineral colloid type, unfilled: to CAN/CGSB-37.2.
- .14 Control Joint Filler:
  - .1 Two component, quick setting, semi-rigid, solvent free, self leveling, polyurea; Minimum tensile strength of 4.5 Mpa; minimum elongation of 200% as per ASTM D412, and a minimum Shore A Hardness of 85 as per ASTM D2240.
- .15 Curing and Sealing Compound:
  - .1 Shall be an acrylic emulsion and water based curing compound, clear in colour. Product shall meet the requirements of ASTM C309 and shall have a maximum VOC content of 300 ounces per cubic foot. (300 grams per litre)
- .16 Surface Hardener:
  - .1 Shall be mineral, non metallic, shake applied. Minimum hardness shall be 6.5-7 on Mohs scale. Minimum compressive strength at 28 days shall be 7200 psi (50 MPa).

## 2.2 CONCRETE MIXES

- .1 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give the following properties for all concrete:
  - .1 Type GU Portland cement.
  - .2 Minimum compressive strength at 28 days: Refer to structural drawings
  - .3 Nominal size of coarse aggregate: 20 mm.
  - .4 Slump at time and point of discharge: as per structural drawings
  - .5 Air content: as per Table 4 of CSA Standard A23.1
  - .6 Chemical admixtures: in accordance with CSA – A3000.
  - .7 Replace 20% of cement by mass with flyash in accordance with CSA-A3000. If floor hardener is to be used in slabs, contact supplier of hardener regarding compatibility between hardener and flyash and adjust flyash content as necessary.
  - .8 Class of exposure shall be to Table 1 of CSA A23.1
  - .9 Concrete Mix design to meet requirements of Table 2 in CSA A23.1 for appropriate class of exposure
  - .10 All concrete to meet requirements of Tables 1 through 4 of CSA A23.1.

## PART 3 – EXECUTION

### 3.1 PREPARATION

- .1 Obtain Departmental Representative's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
- .2 Pumping of concrete is permitted only after approval of equipment and mix.
- .3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .4 Prior to placing of concrete obtain Departmental Representative's approval of proposed

method for protection of concrete during placing and curing in adverse weather.

- .5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .6 In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
- .7 Do not place load upon new concrete until authorized by Departmental Representative.

### 3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1.
- .2 Holes, sleeves and inserts cast in during construction.
  - .1 No sleeves, ducts, pipes or other openings shall pass through beams or column except where indicated or approved by Departmental Representative.
  - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Provided they are shown on structural drawings, sleeves, pipes or openings, that are not greater than 450 mm square, or 450 mm in diameter, may pass through walls and slabs provided that no more than two reinforcing bars are interrupted and additional reinforcing steel is incorporated as per details on structural drawings. Contact Departmental Representative before installing any openings greater than 15 mm x 150 mm or 150 mm diameter that are not shown on structural drawings.
  - .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Departmental Representative before placing of concrete.
  - .4 Check locations and sizes of sleeves and openings shown on drawings.
  - .5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts.
  - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
  - .2 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
  - .1 Install weep hole tubes and drains as indicated.
- .5 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .6 Finishing and Curing:
  - .1 Finish concrete in accordance with CSA-A23.1. Provide steel trowel finish for floor slabs unless noted otherwise. Coordinate finish with architect prior to



- 
- casting slab.
  - .2 Use procedures acceptable to Departmental Representative or those noted in CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
  - .3 Use curing compounds compatible with applied finish on concrete surfaces.
  - .7 Provide depressions to accommodate flooring as required.
  - .8 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
  - .9 Waterstops.
    - .1 Install waterstops to provide continuous water seal. Do not distort or pierce waterstop in such a way as to hamper performance. Do not displace reinforcement when installing waterstops. Use equipment to manufacturer's requirements to field splice waterstops. Tie waterstops rigidly in place.
    - .2 Use only straight heat sealed butt joints in field. Use factory welded corners and intersections unless otherwise approved by Departmental Representative.
  - .10 Joints
    - .1 Construction Joints – Walls and Structural Slabs:
      - .1 In general, incorporate either horizontal or vertical construction joints, in accordance with CSA-A23.1.
      - .2 Immediately before next pour, clean construction joint and brush with grout of neat cement.
      - .3 Run reinforcement through construction joints unless noted otherwise.
      - .4 Construction Joints to be keyed unless noted otherwise.
    - .2 Construction Joints – Slabs on Grade:
      - .1 In general, incorporate construction joints, in accordance with CSA-A23.1.
      - .2 Immediately before next pour, clean construction joint and brush with grout of neat cement.
      - .3 Do not continue reinforcing thru Construction Joint. At slab mid-depth, provide 12 mm diameter plain dowels, greased one side, at 600 mm centres.
      - .4 Construction Joints to be keyed.
    - .3 Slab on Grade Isolation Joints:
      - .1 Do not install isolation joints in structural slabs.
      - .2 Isolation joints around all columns to form a square or round panel. Square isolation joints shall be orientated so all corners of the square align with slab control joints.
      - .3 Install 13 mm thick premoulded joint filler where slab on grade meets vertical surfaces. Install joint filler to within 13 mm of top of slab where sealer is indicated.
    - .4 Slab on Grade Control Joints/Saw cuts:
      - .1 Discontinue reinforcing at saw cut location by stopping reinforcing 75 mm from each side of saw cut location.
      - .2 Saw 3 mm inch wide control joints into top surface of concrete slab. Depth of saw cut shall be between 1/3<sup>rd</sup> and 1/4<sup>th</sup> of total slab thickness. Do not saw-cut suspended slabs on metal deck.
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- .3 Locate control joints as indicated on structural drawings. Maximum spacing of control joints in each direction shall be 30 times the slab thickness. If drawings note different spacing, drawings will govern.
  - .4 Align control joints with columns when possible. Provide control joints in two directions at all inside corners.
  - .5 Timing of cutting control joints is crucial. Cut joints as soon as possible after casting slab. Timing of cutting control joints after casting of slab will vary as weather conditions, concrete mixes, etc. change.
  - .6 Completely clean out saw-cut joints of dirt, oil, grease, and similar contaminants. Mask floor surfaces at joints while filling. Follow recommendations of joint filler manufacturer and fill all saw-cut joints with joint filler as specified.
- .12 Under-slab polyethylene film:
- .1 Install polyethylene vapour barrier under concrete slabs-on-grade inside building.
  - .2 Lap polyethylene film vapour barrier a minimum 150 mm at joints and seal.
  - .3 Seal punctures in polyethylene film vapour barrier before placing concrete. Use patching material at least 150 mm larger than puncture and seal.
- .13 Curing and Sealing Compound:
- .1 Install in accordance with the manufacturers recommendations. Ensure compatibility with flooring adhesives. Remove as required prior to using flooring adhesives.
- .14 Surface Hardener:
- .1 Install in accordance with manufacturers recommendations. Refer to manufacturer for application rates. Do not apply on concrete containing more than 3% air.

### 3.3 SURFACE TOLERANCE

- .1 Concrete tolerance in accordance with CSA-A23.1 straight edge method. Variations over the 3000 mm long straight edge shall be +/- 6 mm.

### 3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory approved by Departmental Representative in accordance with CSA-A23.1 and CSA-A23.2.
- .2 Inspection and testing of concrete and concrete materials will be undertaken at no additional cost to the Contract.
- .3 Testing Laboratory will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .4 Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.2.
- .5 Inspection or testing will not augment or replace Contractor quality control nor relieve him

of his contractual responsibility.

END

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## PART 1 - GENERAL

### 1.1 RELATED WORK

- |    |               |                  |
|----|---------------|------------------|
| .1 | Steel Joists: | Section 05 21 00 |
| .2 | Metal Deck:   | Section 05 31 00 |

### 1.2 REFERENCES

- .1 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .2 ASTM A 325, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 CISC/CPMA 1-73a, A Quick-Drying, One-Coat Paint for Use on Structural Steel.
- .4 CISC/CPMA 2-75, A Quick-Drying, Primer for Use on Structural Steel.
- .5 CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- .6 CSA-G40.21, Structural Quality Steel.
- .7 CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .8 CSA-S16, Consolidation: Limit States Design of Steel Structures.
- .9 CSA-S136, Design of Cold Formed Steel Structural Members.
- .10 CSA-W47.1, Certification of Companies for Fusion Welding of Steel.
- .11 CSA-W48, Filler Metals and Allied Materials for Metal Arc Welding.
- .12 CSA-W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .13 CSA-W59, Welded Steel Construction (Metal Arc Welding).

### 1.3 SHOP DRAWINGS

- .1 Submit erection drawings in accordance with Section 013300. Shop Detail Drawings for individual pieces and for standard connections are not to be submitted.

- .2 Submit shop details of non-standard connections to be used in the connection of structural steel members. Identify on erection drawings the location of all non-standard connections.
- .3 On erection drawings, indicate member size, base plate elevations, anchor bolt size, all details and information necessary for assembly and erection purposes.
- .4 Ensure fabricator designed assemblies, components and connections, and drawings are stamped and signed by qualified professional engineer licensed in the Province of Construction.

#### 1.4 DESIGN OF DETAILS AND CONNECTIONS

- .1 Design details and connections in accordance with requirements of CSA-S16 and CSA-S136 to resist forces, moments, shears and allow for movements indicated.
- .2 If connection for shear only (standard connection) is required:
  - .1 Select framed beam shear connections from an industry-accepted publication such as "Handbook of the Canadian Institute of Steel Construction".
  - .2 If shears are not indicated, select or design connections to support reaction resulting from maximum uniformly distributed load that can be safely supported by beam in bending, provided no concentrated loads act on beam.
- .3 For non-standard connections submit sketches stamped and signed by qualified professional engineer licensed in Province of construction.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- .1 Structural steel: to CSA-G40.21 Grade 350W.
- .2 Hollow structural sections: to ASTM A500 Grade C.
- .3 Channels, angles, plates and rod : Type 300W
- .4 Anchor bolts: to CSA-G40.21, Grade 300W
- .5 Bolts, nuts and washers: to ASTM A-325 and ASTM A-490
- .6 Shear Studs to CSA W59
- .7 Welding materials: to CSA-W48 and CSA-W59 and certified by Canadian Welding Bureau.
- .8 Shop paint: to CISC/CPMA 1-73a and 2-75 as applicable.

- .9 Hot dip galvanizing: Galvanize all structural steel exposed to weather and other steel as indicated on drawings to CSA-G164. Minimum zinc coating shall be 450 grams per square meter.
- .10 "Hump rods" for attachment of masonry walls to steel columns as detailed on structural drawings. Hump rods shall be 6 mm diameter rods welded to columns and shall be compatible with masonry connectors supplied by masonry contractor.
- .11 Anchor bolts through bottom flanges of steel beams and bottom chords of steel joists where steel beam/joist provides lateral support to masonry walls as detailed on structural drawings.
- .12 Angle framing welded to steel beams and joists to provide lateral restraint to top of masonry walls as detailed on structural drawings.

## 2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CSA-S16, S136 and in accordance with reviewed shop drawings.
- .2 Camber steel beams where indicated on structural drawings.
- .3 Continuously seal members by continuous welds where indicated. Grind smooth.
- .4 Provide holes for attachment of other work where required.
- .5 Where finished surfaces of steel are to be left exposed to view, fabricate to AISC specifications for architecturally exposed steel including straightness. Remove mill marks, identification and surface imperfections.
- .6 Exposed welds to be continuous for length of each joint. Grind exposed welds smooth and flush.

## 2.3 SHOP PAINTING

- .1 For steel not to receive finish painting on site:
  - .1 Clean all members of loose mill scale, rust, oil, dirt and other foreign matter, prepare and paint to CISC/CPMA 1-73. Red colour to be used.
  - .2 Apply one coat of paint in shop to all steel surfaces except:
    - Surfaces to be encased in concrete.
    - Surfaces and edges to be field welded.
- .2 For steel to receive finish painting on site:
  - .1 Clean all members of loose mill scale, rust, oil, dirt and other foreign matter, prepare and prime to CISC/CPMA 2-75. Grey primer to be used

- .2 Apply one coat of primer in shop to all steel surfaces.
- .3 Hot dip galvanizing: Galvanize all structural steel exposed to weather and other steel as indicated on drawings to CSA-G164. Minimum zinc coating shall be 450 grams per square meter.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- .1 Structural steel work: in accordance with CSA-S16 and CSA-S136.
- .2 Welding: in accordance with CSA-W59.
- .3 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.
- .4 Installation of "hump rods" on steel columns and angle framing to provide lateral support to masonry walls as detailed on structural drawings. Loose anchor bolts for masonry support will be supplied by this section but installed by the masonry contractor.

#### 3.2 MARKING

- .1 Mark materials in accordance with CSA-G40.20. Do not use die stamping.

#### 3.3 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CSA-S16, CSA-S136 and in accordance with reviewed erection drawings.
- .2 Field cutting or altering structural members: to approval of Departmental Representative.
- .3 Clean with mechanical brush and touch up shop primer to bolts, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.
- .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 safe structure, plumb and in true alignment until completion of erection and installation of necessary permanent bracing.
- .6 Set column base plates and loose bearing plates with steel shims to proper elevation, true and level, ready for grouting-in.

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### 3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Owner.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Departmental Representative.
- .3 Owner will pay costs of testing.

END OF SECTION



## PART 1 - GENERAL

### 1.1 RELATED WORK

- |    |                   |                  |
|----|-------------------|------------------|
| .1 | Structural Steel: | Section 05 12 23 |
| .2 | Steel Joists:     | Section 05 21 00 |

### 1.2 REFERENCES

- .1 CSA-S136, Design of Cold Formed Steel Structural Members.
- .2 CSA-W47.1, Certification of Companies for Fusion Welding of Steel.
- .3 CSA-W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .4 CSA-W59, Welded Steel Construction (Metal Arc Welding).
- .5 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
- .6 ASTM A 653, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .7 CSSBI 10M, Standard for Steel Roof Deck.
- .8 CSSBI 12M, Standard for Composite Steel Deck.
- .9 CAN/CGSB-1.181, Ready Mixed Organic Zinc-Rich Coating

### 1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 013300.
- .2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in province of construction.
- .3 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.
- .4 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

### 1.4 DESIGN REQUIREMENTS

- .1 Design steel deck using limit states design in accordance with CSA S136 and, CSSBI 10M and CSSBI 12M.
- .2 Steel deck and connections to steel framing to carry Dead, Live and other Loads including Lateral Loads, diaphragm action, composite deck action, and uplift as indicated.
- .3 Deflection under specified Live Load not to exceed 1/240 of span, except that when plaster gypsum board ceilings are hung directly from deck, Live Load deflection not to exceed 1/360 of span.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM-A653 structural quality with ZF75 coating, for interior surfaces not exposed to weather and where no finish painting is to occur. Where deck is to be painted on site, supply deck which has had the passivation treatment removed by either mechanical or chemical means. Refer to drawings for minimum base steel thickness.
- .2 Zinc (Z) coated steel sheet: to ASTM-A653 structural quality, passivated, for exterior surfaces exposed to weather or at other locations as noted on drawings. Where deck is to be painted on site, supply deck which has had the passivation treatment removed by either mechanical or chemical means. Refer to drawings for minimum base steel thickness. Minimum zinc coating shall be Z275.
- .3 Closures: in accordance with manufacturer's recommendations.
- .4 Cover plates, cell closures and flashings: In accordance with manufactures recommendations; Steel sheet with minimum base steel thickness to match deck material. Metallic coating same as deck material.
- .5 Primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .6 Acoustic insulation: fibrous glass 16 kilograms per cubic meter density profiled to suit deck flutes.
- .7 Primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .8 Shear studs: to CSA W59.
- .9 Types of Decking

- .1 Steel roof deck: Refer to drawings for minimum base steel thickness and depth of profile. Deck shall be non-cellular with interlocking side laps.
- .2 Acoustic steel roof deck: Refer to drawings for minimum base steel thickness and depth of profile. Deck shall be perforated on vertical face of flutes and be non-cellular with interlocking side laps.
- .3 Composite steel floor deck: Refer to drawings for minimum base steel thickness and depth of profile. Deck shall be non-cellular with interlocking side laps.

## 2.2 FABRICATION

- .1 Include in work of this section cover plates, cell closures, fasteners, stiffeners and accessories as required. Fabricate sheet metal accessories of same material and finish as deck.
- .2 Fabricate to meet specified requirements of CSA-S136 and to support superimposed loading as shown on Structural Drawings.
- .3 Form deck units to provide male and female interlocking side lap joints.
- .4 Fabricate units to provide for joints between abutting panel ends with 50 mm overlap, sized to provide smooth joint. End laps to occur over supports only.
- .5 Span deck units over at least three or more supports wherever possible. Increase thickness of metal to compensate for continuity wherever fewer than three supports may occur.
- .6 Incorporate reinforcing stiffeners for unsupported edges of metal deck.

## PART 3 – EXECUTION

### 3.1 GENERAL

- .1 Structural steel work: in accordance with CSA-S136 and CSSBI 10M and CSSBI 12M.
- .2 Welding: in accordance with CSA-W59, except where specified otherwise.
- .3 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding of steel and/or CSA-W55.3 for resistance welding.

### 3.2 ERECTION

- .1 Erect steel deck as indicated and in accordance with CSA-S136, CSSBI 10M and CSSBI 12M and in accordance with reviewed erection drawings.

- .2 Butt ends: to 3 mm gap. Install steel cover plates over gaps wider than 3 mm.
- .3 Lap ends: to 50 mm minimum.
- .4 Weld and test stud shear connectors through steel deck to steel joists/beams below in accordance with CSA W59.
- .5 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.
- .6 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mil scale and other foreign matter.
- .7 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.
- .8 Place and support reinforcing steel as indicated.
- .9 Install interior cell closures in flutes intersecting vertical surfaces exposed to view, at tops of interior walls and partitions extended to deck.
- .10 Fasten deck to structural steel as indicated on structural drawings. Fasten sheets of deck to adjacent sheets of deck as indicated on structural drawings and as per deck manufacturer's specifications.

### 3.3 OPENINGS AND AREAS OF CONCENTRATED LOADS

- .1 No reinforcement is required for openings cut in deck which are smaller than 150 mm square.
- .2 For deck openings with any one dimension greater than 150 mm and for areas of concentrated load, reinforce in accordance with structural framing details indicated on structural drawings.

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