



**Contract 3215Q**

**Supply and Installation of Fibre Optic Cable in Various City Areas**

Bidders are requested to respond to this Quotation call as instructed subject to the provisions contained herein.

Name of Bidder: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_

Province: \_\_\_\_\_ Postal Code: \_\_\_\_\_

Telephone No: \_\_\_\_\_ Fax No.: \_\_\_\_\_

E-mail: \_\_\_\_\_

Contact Person: \_\_\_\_\_

Title: \_\_\_\_\_

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### **Instructions to Bidders**

- 1) Four (4) sealed quotations, plainly marked on the envelope:

**CONTRACT 3215Q - SUPPLY AND INSTALLATION OF FIBRE OPTIC CABLE**

will be received at the Information Counter, Main Floor, Richmond City Hall, addressed to the Purchasing Section, 6911 No. 3 Road, Richmond, BC, V6Y 2C1, until 12:00 noon, Local time:

Wednesday, November 4, 2009

- 2) Quotations received by the City after the above-mentioned closing time and date will be returned unopened.
- 3) Quotations must be submitted on the attached Forms and be authorized by a signing officer of the Bidder's company. The entire Request for Quotation must be returned to the City.
- 4) This Document with completed Forms will become part of any Contract Documents between the City and the successful Bidder.
- 5) The City reserves the right to accept all or any part of a quotation or to waive irregularities in any quotation at their own discretion. The lowest or any quotation will not necessarily be accepted.
- 6) In accordance with the City's Procurement Policy 3104, award of bids shall be based on:
- (i) The lowest total cost of acquisition,
  - (ii) Experience of the bidder,
  - (iii) Bidder's references of performance on previous similar contracts,
  - (iv) The bidder's financial resources,
  - (v) Bidder's capability of supervision, staffing and use of subcontractors,
  - (vi) Bidder's ability to meet City specifications and performance criteria,
  - (vii) Any additional evaluation criteria stated in the contract document.
- 7) Proprietary names, unless otherwise stated, are used solely to establish standards of materials and finish. Items of other manufacture may be accepted as equal to those specified, at the discretion of the City.
- 8) Prices, in Canadian currency, shall be shown for the work specified and shall include all wages and benefits for those personnel engaged on this contract, expenditures for materials, equipment, travel expenses, assessments for Workers' Compensation, Unemployment

### **Instructions to Bidders (Cont'd)**

Insurance, Canada Pension Plan or any similar statute, costs of subcontracts, insurance premiums, bonds, royalties, permits and licences, taxes, tariffs and duties, overhead, profit, and all other expenditures in connection with the work.

- 9) The contractor will be required to Indemnify and Insure the City as shown in the General Conditions of the Contract.

Bidders shall have the Undertaking of Liability Insurance Form Letter L1-1 within the document completed and submitted with their Quotation.

All policies and certificates shall be submitted to the Purchasing Section before a contract is issued to carry out the work.

- 10) All bids shall be accompanied by an Undertaking of Surety, an Undertaking of Liability Insurance, and a Bid Bond on a form approved by the Insurance Bureau of Canada, all issued by a Surety Company(s) licensed to conduct business in the Province of British Columbia. The Bid bond shall be in an amount not less than 10% of the TOTAL QUOTED AMOUNT. Bidders may submit a Bid Deposit, in the form of a certified cheque, in an amount not less than 10% of the TOTAL QUOTED AMOUNT drawn up in the name of the Owner, in lieu of a Bid Bond. The Undertaking of Surety shall comprise a Performance bond and a Labour and Materials Payment bond, each to be equal in value to 50% of the TOTAL QUOTED

- 11) Bidders shall examine the contract documents and visit the work sites to understand the contract requirements of the project. The City will not make allowances for the contractor's failure to make proper site investigation.

- 12) Bidders shall state on the lists provided to be submitted as part of their quotation, information regarding their previous contracts, subcontractors and equipment that they propose to use to carry out this contract to completion. It is the intention of the City not to award the contract to any Bidder who does not furnish satisfactory evidence that they have the ability and experience to perform the various works covered under this Contract, and that they have sufficient capital and plant to enable them to execute the said works successfully, and to the satisfaction of the City, and to complete and deliver said works as quoted in their Quotation.

- 13) Inquiries during submission of Quotation should be directed to:

Purchasing

Daianna Panni, Buyer

Telephone: 604-276-4270

Business & Financial Services Department E-mail: [purchasing@richmond.ca](mailto:purchasing@richmond.ca)

Purchasing Section

City of Richmond

- 14) The deadline for questions is **Monday, October 26, 2009 5:00 pm**. Please submit all questions in writing to [purchasing@richmond.ca](mailto:purchasing@richmond.ca). All questions and answers and posted on BC Bid and the City Website.

### **Instructions to Bidders (Cont'd)**

- 15) The City reserves the right to accept or reject all or any part of any Quotation including, but not limited to, the right to add or remove the quantity of each item within each option.
- 16) Quotations may be withdrawn by written notice only, provided such notice is received at the office of the City's Purchasing Section prior to the time / date set as the closing time for receiving Quotations.
- 17) Quotations shall be open for acceptance for sixty (60) days following the submission closing date.
- 18) Bidders are advised that submissions of quotes are subject to the Freedom of Information and Privacy Act.
- 19) Any interpretation of, additions to, deletions from, or any other corrections to the Contract documents, will be issued as written addenda by the City. It is the sole responsibility of the potential bidders to check with the City's Website and/or BC Bid to ensure that all available information has been received prior to submitting a bid.
- 20) The City, its agents and employer shall not be responsible for any information given by way of verbal communication.
- 21) Except as expressly and specifically permitted in these Instructions to Bidders, no bidder shall have any claim for any compensation of any kind whatsoever, as a result of participating in the RFQ, and by submitting a quotation each bidder shall be deemed to have agreed that it has no claim.
- 22) The successful Bidder will be required to have a valid City of Richmond Business Licence.
- 23) The City may, prior to contract award negotiate changes to the scope of work, the materials, the specifications or any conditions with any one or more of the bidders without having any duty or obligation to advise the other bidders or to allow them to vary their prices as a result of changes to the scope of work, the materials, the specifications or any conditions. The City shall have no liability to any other bidder as a result of such negotiations or modifications.
- 24) Notwithstanding any other provision in the RFQ documents, the City has in its sole discretion, the unfettered right to:
  - i) accept any quotation
  - ii) reject any quotation
  - iii) eject all quotations
  - iv) accept a quotation which is not the lowest quotation
  - v) accept a quotation that deviates from the specifications or the conditions specified in this RFQ
  - vi) accept all or any part of a quotation
  - vii) split the award between one or more bidders

### Quotation Form

Purchasing Section  
City of Richmond  
6911 No. 3 Road  
Richmond, BC V6Y 2C1

The undersigned Bidder, having carefully read and examined the Instructions to Bidders, Undertaking of Liability Insurance, Quotation Form, Quotation Annexures, General Conditions of Contract, Specifications and Drawings, and having full knowledge of the work required, does hereby offer to provide all necessary materials in strict accordance with the Specifications and to do all therein called for on the terms and conditions and under the provisions therein set forth at the:

**TOTAL QUOTED PRICE OF OPTION A: \$** \_\_\_\_\_

**TOTAL QUOTED PRICE OF OPTION B: \$** \_\_\_\_\_

**TOTAL QUOTED PRICE OF OPTION C: \$** \_\_\_\_\_

**TOTAL QUOTED PRICE OF OPTION D: \$** \_\_\_\_\_

**TOTAL QUOTED PRICE OF OPTION E: \$** \_\_\_\_\_

**TOTAL QUOTED PRICE OF OPTION F: \$** \_\_\_\_\_

**PAYMENT TERMS** \_\_\_\_\_ **EARLY PAYMENT TERMS** \_\_\_\_\_

The above price includes labour, equipment, material, duties, handling and transportation charges, and all other charges incidental to and forming part of this Quotation, **excluding Federal, GST and Provincial Taxes.**

The undersigned Bidder agrees to complete the whole of the works within \_\_\_\_\_ days of acceptance.

Name of Bidder: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone No: \_\_\_\_\_

Name \_\_\_\_\_

Signature \_\_\_\_\_

Title of Signing Officer: \_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_

E-mail: \_\_\_\_\_

Web Address: \_\_\_\_\_

### **Undertaking of Liability Insurance**

(To be submitted with Quotation)

City of Richmond  
6911 No. 3 Road  
Richmond, BC V6Y 2C1

Dear Sirs:

We, the undersigned (insert insurance company's name) \_\_\_\_\_ do hereby undertake and agree to insure the Contractor in the amount of \$5,000,000.00 as outlined in the attached "General Conditions of the Contract" and agree to:

- a. Name the City of Richmond, its officers, officials, agents, and employees as additional insured in connection with the work being proposed by the Contractor.
- b. State that such policy applies to each insured in the same manner and to the same extent as if separate policy had been issued to each insured named in the policy.
- c. State that the policy cannot be cancelled, lapsed, or materially changed without at least thirty (30) days written notice of cancellation delivered to the City Clerk of the City of Richmond at 6911 No. 3 Road, Richmond, BC V6Y 2C1.
- d. State that coverage provided by such insurance shall protect the Contractor and the City of Richmond during the performance of the works and services specified in the attached Form of Quotation and specifically that the insurance required by such Quotation shall be consistent with the requirements therein.

if the Contract is awarded to (insert bidder's name) \_\_\_\_\_

EXCEPTIONS:

\_\_\_\_\_

Dated at \_\_\_\_\_, British Columbia, this \_\_\_\_ day of \_\_\_\_\_, 2009.

BY: \_\_\_\_\_ TITLE: \_\_\_\_\_

This form is to be signed by the Insurance Company or an authorized Broker on behalf of the Insurance Company.

A SEPARATE FORM IS TO BE SIGNED FOR EACH POLICY IF MORE THAN ONE POLICY IS APPLICABLE.



**List of Previous Contracts**

The Bidder has recently undertaken and completed the Contracts described following and authorizes the City of Richmond to inquire as to the nature of the Bidders performance on these contracts.

YEAR	PROJECT TITLE	OWNER PHONE # CONTACT	SCOPE	BUDGET		SCHEDULE		ROLE OF KEY STAFF MEMBERS	OTHER RELEVANT INFO
				Original	Actual	Proposed	Actual		

(If additional space is required, attach additional)

### **List of Subcontractors**

The Bidder agrees that the subcontractors shown herein is the list of subcontractors proposed to use to carry out those parts of the work shown on the list, and, subject to their approval by the City, the Bidder agrees to employ the listed subcontractors and no others.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

The Bidder agrees that if awarded the contract, the bidder will bind every subcontractor by the terms of the contract documents, as far as applicable to the work.

<b>Description of Parts of Work to be Sublet to Subcontractors</b>	<b>Name, Address, and Telephone Number of Subcontractor(s) to be Used to Carry Out the Various Parts of the Work Described</b>

(If additional space is required, attach additional)

**List of Equipment**

The Bidder proposes to use the equipment listed below in carrying out the work covered by this Contract (list only the major pieces of equipment to be used):

<b>Number of Units</b>	<b>Brief Description of Equipment (state its use, make, age, and general condition)</b>	<b>Check Whether: Owned by Bidder      Rented/ Leased</b>

(If additional space is required, attach additional)

### List of Project Drawings

<b>Drawing No.</b>	<b>Sheet No.</b>	<b>Title</b>
Map-3215	1 of 1	Contract 3215 Fibre Cable Routing
Map-Conduit	1 of 1	Communications Conduit Network
Comm-2	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-3	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-4	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-5	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-6	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-7	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-8	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-12	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-18A	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points
Comm-18B	1 of 1	Communications, Conduit/Cable Network, Controllers, Junction Boxes & Cable Splice Points

## Specifications

### Scope of Work

The Contractor shall supply, install, terminate in bulkheads/enclosures, test and selectively splice fibre optic cable within a City owned communications conduit network as shown on the Contract drawings. The conduit ranges in size between 32mm to 75mm. Some sections of the conduit network have existing copper and/or fibre communications cable inside. The existing cable must be maintained (operational) during the installation of the fibre optic cable. For the most part, two separate cables will be installed concurrently in the same conduit, one cable referred to as "IT" that runs between City buildings, the other referred to as "Traffic Signals" that will run between selected City buildings and noted traffic signal devices along the installation route. The entire length of IT network cable between City buildings shall be on a single reel, including uninterrupted installation in conduit to avoid mid span splices (unless otherwise noted). Traffic signal network cable will be cut and terminated at selected buildings and noted traffic signal devices along each route.

#### Cable installation:

- supply and install fibre optic cable in new (empty) and occupied (existing cable) conduit as indicated on the design drawings. (conduit has been cleaned and pull strings installed)
- terminate/splice fibre optic cables at locations as indicated on the design drawings.
- supply and install splice enclosures as per specifications and manufacturers recommendations.

#### Cable Testing:

- all fibres shall be tested on the reel prior to installation.
- all fibres shall be tested after installation and prior to splicing.
- all fibres shall be tested end to end after splicing.
- all end-to-end tests shall be witnessed by the City and/or it's agent.

#### Documentation:

- the Contractor shall supply the City with copies of all test results as defined in the Fibre Optic Cable Installation Specifications.
- the Contractor shall supply the City with an electronic file of the splice charts. Splicing details shall be finalized with the successful Contractor at a pre-construction meeting after the award of this Contract.

#### Cable termination in buildings:

- supply and install fibre termination cabinets
- coil the cable at established end points in each building and terminate on in-building fibre termination cabinets.

Cable termination at traffic signal devices:

- coil the cable at established traffic signal cabinets and terminate in fibre termination patch panels (patch panels supplied and installed by others).

### **Contractor Qualifications**

In-Building terminations – The Contractor must be an approved/certified Commscope Systemax Installer capable of providing a Commscope manufacturer 20 year warranty on the installation.

Traffic Signal cabinet terminations – The Contractor shall have proven fibre splicing/termination experience in traffic signal cabinet environments. Include references in quotation.

Cable Installation - The Contractor shall have proven multiple fibre cable installations in outdoor physical plant with experience in traffic signal or similar cabinet environments. Include references in quotation.

### **Location of Work**

Within the City of Richmond at the following routes and locations:

Reference Drawing – Master drawing – Map-3215

Additional reference for recent 2009 Richmond street photo's available @ Google Street View.

Option A - City Hall to City Works Yard  
Location: 6911 No 3 Road to 5599 Lynas Lane

Reference Drawings – Comm-4, Comm-6, Comm-7,

IT Cable – 192 fibres – single cable, no splices, (start @ City Hall (6911 No. 3 Road)\_service entrance room first floor, end @ Works Yard (5599 Lynas Lane) – east side of Stores building – IT backup facility, second floor) – Via Minoru Blvd, Westminster Hwy, and Lynas Lane. Total building termination locations = 2.

Traffic Signal Cable– 12 Fibres - single cable, termination at each traffic signal along route, (start @ City Hall service entrance room first floor, end @ Works Yard – east side of Stores building – IT backup facility, second floor) – via Minoru blvd, Westminster Hwy, and Lynas Lane. Total building termination locations = 2. Total traffic signal cabinet locations = 8. Total (single 12 fibre packet) cabinet terminations = 16

Note 1: Option “B” would add a 48 fibre cable to the portion of the link from Works Yard to No. 2 Road & Westminster Hwy.

Note 2: Option “D” would entail a splice in the 192 cable at Minoru Blvd. & Westminster Hwy.

Option B - City Works Yard, Fire Hall No. 4, Sea Island Community Centre  
Location: 5599 Lynas Lane to 3911 Russ Baker Way to 3911 Russ Baker Way

Reference Drawings – Comm-4, Comm-18A,

IT Cable – 48 fibres – single cable, no splices, (start @ Works Yard – east side of Stores building – IT backup facility, second floor, end @ Fire Hall # 4 Communications Room (3911 Russ Baker Way). Start @ Fire Hall # 4 Communications Room, end @ Sea Island Community Centre Communications Room (7140 Miller Road). Via Lynas lane, No. 2 Road, No. 2 Road Bridge, Russ Baker Way, and Miller Road. Total building termination locations = (2 plus existing termination at Works Yard from Option “A”).

Traffic Signal Cable– 12 Fibres - single cable, termination at each traffic signal along route, (start @ No. 2 Road & Westminster Hwy. cabinet, end @ Russ Baker Way and Miller Road cabinet) via No. 2 Road/Westminster Hwy., No. 2 Road Bridge, Russ Baker Way. Tap off cabinet @ Russ Baker/Cessna into Fire Hall # 4 Communications Room (3911 Russ Baker Way). Total building termination locations = 1. Total traffic signal cabinet locations = 6. Total (single 12 fibre packet) cabinet terminations = 10.

Option C – Russ Baker Way & Miller Road to YVR Traffic Signals

Reference Drawing – Comm-18B,

Traffic Signal Cable– 12 Fibres - single cable, termination at each traffic signal along route. From the N/W corner traffic signal cabinet of Russ Baker Way & Miller Road to the N/E corner of Connector 2 & Miller Road, via Grant McConachie Way. From Templeton Street and Miller Road to Templeton Street and North service Road, via Templeton Street. Total traffic signal cabinet locations = 6. Total (single 12 fibre packet) cabinet terminations = 10.

Option D – Minoru Boulevard & Westminster Highway to Cedarbridge Way RCMP

Reference Drawing – Comm-7,

IT Cable – 48 fibres – single cable, splice 48 cable to 192 cable at the S/E corner of Minoru Boulevard & Westminster Highway. Install cable to RCMP office building (5840 Cedarbridge Way) via Minoru Boulevard and the lane behind the RCMP building. Terminate in RCMP Communications room, second floor. Total building termination locations = 1. Total underground splice locations = 1. Splicing details to be provided following Contract Award.

Traffic Signal Cable– 12 Fibres - single cable, terminate at each traffic signal along route. Start at traffic signal cabinet at Minoru Blvd. & Westminster, end at traffic signal cabinet Minoru Blvd. & Lansdowne Road via Minoru Boulevard. Total traffic signal cabinet locations = 3. Total (single 12 fibre packet) cabinet terminations = 4.

Option E – Link A – Thompson Community Centre to Fire Hall No. 2  
Location: 3200-3398 Springhill Place to 11011 No. 2 Road

Reference Drawings – Comm-4, Comm-3, Comm-2,

IT Cable – 96 fibres – single cable, no splices, (start @ the communications room, Thompson Community Centre to No. 2 Road & Granville Avenue to the S/W corner of No. 2 Road & Francis Road to the S/W corner of No. 2 Road & Steveston Highway. (For future cable installation to new Fire Hall at No. 2. Road and Steveston Highway, coil 100 metres of 96 fibre cable in vault in SW corner. Terminate in above ground communications cabinet adjacent to vault.) Via Lynas lane, Granville Avenue and No. 2 Road. Total building termination locations = 2.

Traffic Signal Cable – 12 fibres – single cable, terminate at each traffic signal along route. (start @ the communications room, Thompson Community Centre to No. 2 Road & Granville Avenue to the S/W corner of No. 2 Road & Francis Road to the S/W corner of No. 2 Road & Steveston Highway. (For future cable installation to new Fire Hall at No 2. Road and Steveston Highway, coil 100 metres of 12 fibre cable in vault in SW corner.) Via Lynas lane, Granville Avenue and No. 2 Road. Total building termination locations = 2. Total traffic signal cabinet locations = 8. Total (single 12 fibre packet) cabinet terminations = 15.

**Option E – Link B – No. 2 Road & Francis Road to West Richmond Community Centre**

**Location: No. 2 Road & Francis Road to 9180 No. 1 Road**

Reference Drawing – Comm-3,

IT Cable – 48 fibres – single cable, no splices, (start @ No. 2 Road & Francis Road, end @ West Richmond Community Centre communications room. Splice the 48 fibre cable to the 96 fibre cable in the 5686 box at the S/W corner of No. 2 Road & Francis Road. Splicing details to be provided following Contract Award. Total building termination locations = 1. Total underground splice locations = 1.

Traffic Signal Cable – 12 fibres – single cable, terminate at each traffic signal along route. (start @ the S/W corner of No. 2 Road & Francis Road, end at No. 1 Road and Francis Road traffic cabinet. Coil additional 40 metres of cable in 5686 box SE corner No. 1 Road & Francis Road. Total traffic signal cabinet locations = 3. Total (single 12 fibre packet) cabinet terminations = 4.

**Option E – Link C - Fire Hall No. 2 to Steveston Community Centre**

**Location: 11011 No. 2 Road to 4111 Moncton Street**

Reference Drawing – Comm-2,

IT Cable – 48 fibres – single cable, no splices, (start @ the S/W corner of No. 2 Road & Steveston Highway, end @ Steveston Community Centre Communications room). (For future cable installation to new Fire Hall at No 2. Road and Steveston Highway, coil 100 metres of 48 fibre cable in vault in SW corner No. 2/Steveston. Terminate in above ground communications cabinet adjacent to vault.) Via Steveston Highway, Railway Avenue and Moncton Street. Total building termination locations = 2.

Traffic Signal Cable – 12 fibres – single cable, terminate at each traffic signal along route. (start @ the S/W corner of No. 2 Road & Steveston Highway . Via Steveston Highway, Railway Avenue, Moncton Street, and No 1 Road. Total traffic signal cabinet locations = 5. Total traffic signal cabinet terminations = 8.

**Option F – Fire Hall No. 2 to Ironwood Library**

**Location: 11011 No. 2 Road to 11688 Steveston Highway, Unit 8200**

Reference Drawings – Comm-2, Comm-5, Comm-8, Comm-12,

IT Cable – 48 fibres – single cable, no splices, (start @ the S/W corner of No. 2 Road & Steveston Highway to the Ironwood Library to No. 5 Road & Horseshoe Way via Steveston Highway and No. 5 Road. (For future cable installation to new Fire Hall at No 2. Road and Steveston Highway, coil 100 metres of 48 fibre cable in vault in SW corner. Terminate in above ground communications cabinet adjacent to vault.) Terminate 48 fibre cable in Library Communications room. Via Steveston Highway, No 5 Road. Total building termination locations = 2.



Traffic Signal Cable – 12 fibres – single cable, terminate at each traffic signal along route. (start @ the S/W corner of No. 2 Road & Steveston Highway, end @ cabinet No. 5 Road & Horseshoe Way. Via Steveston Highway, No 5 Road . Total traffic signal cabinet locations = 9. Total traffic signal cabinet terminations = 16.

## **FIBRE OPTIC CABLE SPECIFICATION:**

### **Description**

This section covers the requirements for fibre optic cable to be installed in existing underground conduit.

### **Material Requirements**

All Fibre optic cable shall be supplied to the following specifications or better:

(Preferred manufacturer: Commscope Systimax Teraspeed singlemode # 5028 xxxA WXBK (where xxx indicates strand count) or equivalent)

Number of Fibres:	192, 96, 48 and 12 fibres as shown on design drawings.
Construction:	Cable shall be loose tube construction with a sheath consisting of medium or high-density polyethylene construction. The cable shall be all dielectric construction. Cable shall be suitable for buried or underground installation. Cable shall have a dry block to keep out water.
Physical Characteristics:	Minimum static bending radius shall not be greater than 10 X cable diameter. The minimum-bending radius during installation and under tension shall not be greater than 20 X the cable diameter. Cable shall be able to withstand a pulling tension of 2500N without any resulting damage. The cable shall have a maximum outside diameter of no more than 0.75”(19.05mm).
Environmental:	Cable shall be suitable for operation over a temperature range of -20°C to +60°C.
Buffer Tubes:	All fibres shall be housed in buffer tubes. Buffer tubes shall be colour coded as per EIA 455 standards. Twelve fibres per buffer tube.
Fibres:	All fibres shall be singlemode, with nominal core diameter of 8.3-9.0µm and nominal cladding diameter of 125µm. All fibres shall be encased in a protective polymer coating.
Optical Characteristics:	All fibres shall have an attenuation not greater than 0.35dB/km at 1300nm and 0.25dB/km at 1550nm
Packaging:	All cable shall be supplied on wooden reels, with both ends of the cable accessible for testing. Each reel shall be clearly labelled with “City of Richmond Fibre Cable”, as well as the cable code, length, and date of manufacture. All reels shall be protected with solid (2x4) wooden lagging, intended for export shipment.

### **Factory Testing**

The bandwidth and attenuation of every fibre in each cable shall be tested in the factory. Measurements shall be taken at 1300nm and 1550nm.

These factory test results shall be provided with the cable. One copy shall be delivered to the City and one copy shall be attached to the cable reel, inside the lagging, prior to shipment.

### **FIBRE OPTIC OUTDOOR CABLE SPLICE ENCLOSURES:**

This specification section covers all splicing and termination materials required for the fibre optic network. These materials include outdoor fibre optic splice enclosures and fibre optic patch panels.

Outdoor fibre optic splice enclosures, intended for use in underground pull box locations shall provide physical protection for splicing of fibre cables as noted on the drawings. The splice enclosure shall be suitable for outdoor use.

Physical:	The splice enclosure shall protect the fibres from moisture and mechanical damage, and shall be suitable for installation in a subterranean splice vault. The enclosure shall provide sufficient space to enclose all splice trays required, as well as at least 1.83m (6 feet) of loose tube buffers from cables entering the enclosure.
Materials:	All materials in the splice enclosure shall not support galvanic cell action.
Re-entry:	The splice enclosure shall be re-enterable in a manner that does not reduce the protection offered by the unit.
Strain Relief:	Strain relief provisions suitable for outside plant cables shall be made for each cable entering the enclosure.
Splice Trays:	Fibre Optic Splice Trays suitable for fusion splicing shall be supplied with each enclosure. Sufficient trays shall be supplied to splice all fibres in the enclosure, placing no more than 12 fibres on a tray.
Waterproofing	The enclosure shall be able to withstand 1-meter head of water without any water ingress in the closure.

### **Fibre Optic Patch Panels**

1. In-building fibre optic patch panels shall be supplied by the bidder.

Fibre Optic Patch Panels/cords:

- Fibre Optic patch panels and all required accessories will be supplied, installed and terminated to under this contract
- Supply Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)
- All terminations to be high density LC type connectors
- Provide qty 4 (per termination closet location) of Commscope Teraspeed LC/LC 1.6mtr patch cords # FPCWLCLC22

2. Traffic signal patch panels will be supplied and installed by the City.

## **FIBRE OPTIC CABLE INSTALLATION SPECIFICATIONS:**

### **Fibre Optic Cable Installation**

#### **Conduit Cleaning and Stringing**

Conduit cleaning and stringing has been completed by the City in preparation for the fibre cable installation. In the event conduit sections found by the bidder to be blocked shall be reported to the City to take remedial action.

#### **Cable**

Care will be exercised at all times to ensure that the fibre optic cable is not bent with a radius of less than 20 X the cable diameter during installation and less than 10 X the cable diameter after completion of the installation.

When cable on a reel is to be installed in two directions from a central point, or the installation of a cable run is completed in stages, the contractor shall utilize a figure eight method to coil cable. Any damaged cable sections shall be replaced from splice to splice by the Contractor at his expense.

The cable will be continuous between stations and/or splices as indicated on the plans. The Contractor shall not cut the cable to aid in installation, unless approved in writing by the City.

#### **Cable and Reel Marking Verification**

Inspect the reel and cable for possible damage caused during transportation or handling. Watch for protruding nails or damaged reel flanges.

All damage to reels or cable shall be reported to the City for inspection before pulling.

If it is necessary to roll the reel to the desired location, roll it in the direction of the arrow on the reel.

When handling a heavy cable reel, maintain careful control of its movement. Never permit a reel to tilt.

Where uneven ground conditions are encountered, provide a substantial runway of heavy planks, levelled with blocking, to prevent tilting.

Prior to setting up a reel, verify the reel number, size, and length of the cable with the information given on the reel assignment sheet.

### **Cable Reel Set-Up**

Set up the reel at the service box at the conduit section in which the cable is to be placed.

The reel should be aligned with the duct and in such a position that the cable can be passed from the top of the reel in a long, smooth bend into the duct without twisting. Never leave a rotating reel unattended.

When a cable reel trailer is not available or cannot be used, cable reel jacks may be used. However, stability and proper installation are very important when using jacks. Make sure spacers are placed on the shaft in both cases to prevent binding

Ensure there is adequate space for figure-eighting the cable.

If the duct line in which the cable shall be pulled, contains a curve or bend, set-up the reel at the service box/manhole nearer to the curve if conditions permit.

### **Cable Installation**

The contractor shall use either of the following methods to install the fibre cable in the conduit.

- i. Mechanical pulling
- ii. Pneumatic (blowing)

The following specification pertain mainly to mechanical pulling of cable, however portions of the specification also applies to other methods such as pneumatic.

### **Installation Specifications**

A dynamometer shall be used for all pulling operations.

Running line dynamometers or tension Limiters shall be used to determine pulling tension applied to the cable during placement.

Maximum pulling tensions for cable pulled in conduit shall not exceed 600 lbs. or amount specified by cable manufacturer.

Cable shall not be subjected to a dynamic bending radius of less than 20 times the outside diameter of the cable.

The minimum static bending radius for cable in place shall be 10 times the outside diameter of the cable.

Where feasible, continuous cable pulls shall not be made through more than one 90-degree bends or more than a total of 180 degrees in conduit bends. However, when this is not possible, the cable pull shall be monitored to ensure that the pulling tension shall not exceed 2700N (600 lbs) or the amount specified by the manufacturer.

Record cable footage or meter markings at all service box locations and utility crossings.

Cable shall not be cut without approval from the City.

Where fibre cable is being installed into empty conduit, add a metallic tracer wire to that portion of the link.

The use of a Kellum grip is acceptable for pulling cable through conduit. It is recommended that the central strength member and/or kevlar be woven into and secured onto the grip on these pulls.

600 lb. breakaway swivel shall be used on all underground cable pulls.

Cable lubrication shall be used to reduce pulling tension on longer segments of the cable placement operation. Only approved pulling lubricants shall be used.

At each splice or location a 30 m coil of fibre shall be left on each cable end for the splicing and storage of slack cable. This is the length required before preparing the cable for splicing.

At each traffic signal location and approximately every 200 metres at least a 5 m coil of fibre shall be left in the selected junction box for storage of slack cable. Actual junction box locations and actual estimated slack in each box will be finalized with the Contractor prior to cable installation.

All cable ends shall be sealed until spliced and tested, and directional tags shall be placed at each location to indicate direction of cable.

All cable shall be on-reel tested upon receipt at the storage yard, and a copy of the completed test reports on diskette shall be issued to the City.

Cable shall be tested again after placement.

Non-disposable reels shall be handled and transported with care to a location as designated by the City for return to cable vendor.

When figure-eighting is performed (in pulling operations) in more than one location on one cable end, the complete figure eight shall be flipped.

A hydraulic cable pick-up reel or bull wheel may be used to pull cable at intermediate manholes instead of making a second figure eight, providing the reel has a 700 mm diameter or greater drum.

When pulling cable from two directions, always set up to pull the longest section first to minimize figure-eighting.

When it is not possible to locate the pulling apparatus adjacent to the service box, a 'C' manhole sheave should be used.

Where the service box/manhole opening does not permit the use of 71 cm diameter sheaves, a quadrant block shall be used to ensure a dynamic bending radius of at least 6 m.

A cable feeder shall be used to protect and guide the cable into the duct.

- Where an extension section is required, its nozzle end shall be placed in the bell end of the main section.
- The cable feeder also shall be used to feed lubricant onto the moving cable.

Always place the appropriate fusible link and swivel between the cable pulling eye and the pull line.

Place a marker consisting of several turns of friction tape on the pull line, 6 m from the cable end. This marker shall be used to indicate when the cable is about to enter the manhole.

Before starting the pull, check the equipment carefully to minimize the chance of interruption once pulling has started.

Inspect the cable reel to ensure there are no factory reel defects, exposed nails, splinters, or similar hazards that could cause cable damage.

Verify that the cable was wrapped properly at the factory.

A pulling speed of 24 to 30 m per minute is required.

Watch the cable carefully as it unreels, continually inspecting it for sheath defects or damage.

If a cable defect or damage is noticed during the pull, stop the pull and have the City inspect the cable before resuming the pull.

When stops are necessary, the pull line operator shall stop the pulling operation, but shall not release tension unless signalled to do so. In starting up again, the inertia of the cable shall be overcome by gradually increasing the tension in steps a few seconds apart until the cable starts to move.

## **Fibre Optic Splicing**

### **Splicing**

Prior to splicing, the optical length of each cable section shall be recorded on the splice loss worksheet.

All fibres shall be spliced in accordance with and as designated in the splice assignment sheets that will be finalized at the pre-construction meeting after the award of this Contract. Splice assignment sheets shall be provided by the Contractor.

All fibres are to be fusion spliced and organized, spliced and secured in the splice closure.

All spliced fibres shall be protected by sleeve or splice pack.

To ensure acceptable splices prior to closing the splice case, each splice shall be monitored during the splicing operation using an OTDR.

Each splice is to be tested bi-directionally at 1550 nm or 1310 nm as directed by The City.

- The maximum splice loss, in one direction, shall be 0.05 dB.
- The bi-directional average loss shall be 0.05 dB.
- The OTDR test results shall be submitted to the City in PDF format on a CD-ROM/DVD-ROM.

Negative losses, or gains, shall be added to positive losses and averaged to determine the bi-directional splice loss. Gains or loss may not exceed 0.1 dB and shall be within ten percent (10%) of each other when tested bi-directionally.

If after five attempts, or where high negative loss values are being consistently obtained and the average splice loss objective cannot be met, the City shall be notified and continue as follows:

In the presence of the City an additional three attempts to splice the cable shall be made. If the splice then meets the specifications, splicing activities can be completed at this location.

If the splice fails to meet the specifications after attempting to splice the cable in front of the City, a 3 ft. section of cable from each of the cables being spliced shall be cut off, and given to the City.

- The splicing shall then be re-attempted.
- If after five additional attempts, the splice fails to meet the performance objectives the above procedure shall be repeated.

It is imperative that all out-of-limit splices be reported and documented immediately with the City. Failure to do so could cause re-entry into the splice for re-splicing.

### **Testing**

An Optical Time Domain Reflectometer (OTDR) capable of producing fibre test documentation in PDF format on computer disks and on a laser printer shall be used.

These disks along with the software needed to view and record the test data, shall be turned over to City two days after testing is completed.

All test equipment shall be calibrated within ninety days prior to testing.

A sticker with the date of calibration from the factory or certified test lab shall be fixed to equipment.

A certification document shall accompany all test data for that piece of equipment.

For purposes of OTDR testing, bare fibre adapters (delimiters) may be used.

The OTDR shall be capable of storing traces electronically and shall have suitable dynamic range and performance characteristics.

A patch cord of sufficient length to ensure that start of the fibre under test is not in the “dead zone” of the OTDR shall be used for all testing, and the first connector of the link under test shall be visible on the trace.

Prior to testing, all fibre optic connectors and bare fibre ends shall be properly cleaned using a residue free alcohol solution (better than 91 % de-natured alcohol and distilled water) and compressed air.

The vertical and horizontal scales used on the OTDR shall be expanded to maximize the amount of detail shown on the OTDR trace, even if these parameters can be adjusted later using display software.

The fibre number and end points of the fibre link under test (“from” and “to”) shall be recorded electronically on the OTDR with the trace.

OTDR traces shall be recorded on CD-ROM/DVD-ROM in MS-DOS formatted files. As applicable, the software and applicable licenses required to read the OTDR traces shall be provided to the City at no extra charge.

The Sub-Contractor shall ensure that traces identify the end points of the fibre under test and the fibre designation. If this information is not provided by the trace itself, a cross-reference table between the stored trace file name and the fibre designation shall be provided

### **Bi-directional OTDR splice test**

Each fibre at each point shall be tested bi-directionally at 1310 nm or 1550 nm with an OTDR capable of long range and high resolution testing.

The test shall be from an end point designated by the City.

The test results shall be submitted to the City on a “Splice Loss Worksheet”.



### **End-to-End Bi-directional Span Test**

Each fibre of each span shall be tested at 1310 nm or 1550 nm, as directed by the City, from end point to end point.

End-to-end span losses shall be within the loss calculations specified for each span.

This test shall be performed after all of the splicing within the span has been completed, splice cases closed, encapsulated and positioned.

### **End-to-End Power Test**

Each fibre of each span shall be tested in both directions from end-to-end using a 1310 nm stabilized high light source and power meter.

The results of this test are to be recorded on the test data sheets provided and submitted to the City.

### **Cable Fault Path**

Where applicable the cable fault path (armour sheath or metallic member) shall be tested for continuity between each splice and the results recorded on a splice loss worksheet provided.

### **Documentation**

Test data results shall be submitted to the City on the applicable test data forms.

The test data forms shall be completely and legibly filled out.

Test data results shall be submitted as a neatly organized and indexed document for each span.

The document shall contain the following:

- Splice attempt worksheet(s).
- Splice loss worksheet(s).
- Span overview.
- Splice assignment sheet.
- Contractor and/or subcontractors comments
- Identification of test equipment used for each test and accompanying calibration certificate

Copies of all OTDR fibre tests on computer CD-ROM/DVD-ROM, labelled with endpoints and the date of the test. Final test results shall be recorded on the test record forms included as Tables 1 and 2.

### **In-Building Fibre Cable Terminations**

The contractor shall coil service loops of cable at established end points in each building. Fibre cable shall be terminated into contract supplied/installed patch panels and any wall mount racks needed to support them. Contractor shall supply and install any needed required plywood backing on the walls of the Communication rooms for these racks/enclosures. The fibre termination cabinets to be supplied shall be Commscope Systimax model #: 600G2 type (no alternates). The size of each respective cabinet and type (eg. number of terminations) will be as appropriate for each RFQ section(s) (eg. each link) cable size.

Fibre Optic Patch Panels/cords:

- Fibre Optic patch panels and all required accessories will be supplied, installed and terminated to under this contract
- Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)
- All terminations to be high density LC type connectors
- Provide qty 4 (per termination closet location) of Commscope Teraspeed LC/LC 1.6mtr patch cords # FPCWLCLC22

### **In-Cabinet Traffic Signal Fibre Cable Terminations**

The Contractor shall be responsible for pulling the fibre optic cables (one per direction along the main corridor) into the traffic signal cabinets and undertaking the termination of the cables.

The fibre optic cable shall be pulled into the traffic signal controller cabinet such that a coil (not violating the cable manufacturer bend radius) of no less than 2 meters remains at the bottom of the cabinet, post completion of the cable termination.

Termination of the fibre optic cable shall be per LC Type Connectors. All fibres are to be terminated so as to have the LC Connectors arranged into a vertical row (sequence of fibres 1/2 at the top through 11/12 at the bottom) within the Patch Panel facility. A second row for the second fibre optic cable is to occupy a parallel row of LC Connectors (same numeric sequence for fibre termination).

#### **Patch Panel Arrangement shall be:**

	Cable 1	Cable 2
Fibres 1&2	□□	□□
Fibres 3&4	□□	□□
Fibres 5&6	□□	□□
Fibres 7&8	□□	□□
Fibres 9&10	□□	□□
Fibres 11&12	□□	□□

All patch panel connectors shall have protectors installed immediately post-termination of fibres to ensure clean connector sockets.

All fibre cables are to be tested by the Contractor upon completion of terminations, using the LC Connectors, with the OTDR data being recorded on a per link basis for all 12 fibres per cable and each traffic signal cabinet location affected.

**Traffic Signal Fibre Optic Patch Panel**

The fibre optic patch panels shall be supplied and installed at each traffic cabinet by the City prior to termination work by the Contractor.

**TEST RESULTS – FIBRE OPTIC CABLES**  
**Pre Installation Testing**

Wavelength of Test: \_\_\_\_\_

**TABLE 1**

<b>Reel Number</b>	<b>Fibre Tested</b>	<b>Measured Attenuation (dB/km)</b>

Tested by: \_\_\_\_\_ Witnessed by: \_\_\_\_\_

Date: \_\_\_\_\_

**TEST RESULTS - FIBRE OPTIC CABLES**  
**Post Installation Testing**

**TABLE 2**

<b>Power Meter Location</b>	<b>Light Source Location</b>	<b>Fibre Number</b>	<b>Wavelength Measured</b>	<b>Attenuation (dB)</b>

**Tested by:** \_\_\_\_\_

**Witnessed by:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**SCHEDULE OF ESTIMATED QUANTITIES AND PRICES:**

(Unit prices for the supply and installation of fibre optic cable shall include all cable testing and documentation.) Please supply the manufacturer's make and model of the fibre optic cable proposed for this project, multiple cable options for manufacturers and pricing is acceptable:

192 fibre cable = \_\_\_\_\_

96 fibre cable = \_\_\_\_\_

48 fibre cable = \_\_\_\_\_

12 fibre cable = \_\_\_\_\_

60 fibre cable = \_\_\_\_\_

24 fibre cable = \_\_\_\_\_

All unit prices given are to include labour, equipment, material and overhead costs. Quantities given below are an estimate only; the Contractor shall be paid based upon the actual units installed for each Option. Cable estimates here include cable slack. Actual junction box locations and cable slack in each box will be finalized with the Contractor prior to cable installation.

**OPTION A: City Hall to City Works Yard**

A. Supply and install 192 and 12 fibre cables in 50mm conduit with existing cable as per drawings.  
Price per metre \_\_\_\_\_ x estimated quantity 2750 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. Supply and install 192, 48 and 12 fibre cables in empty conduit and conduit with existing cable as per drawings.  
Price per metre \_\_\_\_\_ x estimated quantity 900 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. In - Building termination – Supply and install Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)  
Total building termination locations = 2, (City Hall and Works Yard).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

D. IT & Traffic Cable – Terminate all strands from single packet In-Building communications room.

Price per single strand termination \_\_\_\_\_ x quantity 252 strands =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

E. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 16 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

Note 1: Option “B” would add a 48 fibre cable to the portion of the link from Works Yard to No. 2 Road & Westminster Hwy which is costed here.

Note 2: Option “D” would entail a splice in the 192 cable at Minoru Blvd. & Westminster Hwy.

**TOTAL VALUE OF OPTION A:**

**Subtotal \$** \_\_\_\_\_

**PST\$** \_\_\_\_\_

**GST\$** \_\_\_\_\_

**Total \$** \_\_\_\_\_

Carry over the total value price to QUOTATION FORM, page 6 under TOTAL QUOTED PRICE OF OPTION A.

**Option B - City Works Yard, Fire Hall No. 4, Sea Island Community Centre**

A. Supply and install 48 and 12 fibre cables in conduit with existing cable as per drawings.

Price per metre \_\_\_\_\_ x estimated quantity 3800 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

Note 1: Option “B” would add a 48 fibre cable to the portion of the link from Works Yard to No. 2 Road & Westminster Hwy of which this portion of the link is costed in Option “A”

B. In - Building termination – Supply and install Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)

Total building termination locations = 2, (Fire Hall # 4 and Sea Island Community Centre).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. IT & Traffic Cable – Terminate all strands from single packet In-Building communications room.

Price per single strand termination \_\_\_\_\_ x quantity \_\_48\_\_ strands =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_.

D. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 10 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

**TOTAL VALUE OF OPTION B:**

**Subtotal\$** \_\_\_\_\_

**PST\$** \_\_\_\_\_

**GST\$** \_\_\_\_\_

**Total \$** \_\_\_\_\_

Carry over the total value price to QUOTATION FORM, page 6 under TOTAL QUOTED PRICE OF OPTION B.

**Option C – Russ Baker Way & Miller Road to YVR Traffic Signals**

A. Supply and install 12 fibre cable in 75mm conduit with existing 6 pair copper cable as per drawings.

Price per metre \_\_\_\_\_ x estimated quantity 2750 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. Traffic Signal Cable - Terminate all strands from single packet in traffic signal cabinets.

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 10 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_.



**TOTAL VALUE OF OPTION C:**

**Subtotal\$**

**PST\$**

**GST\$**

**Total \$**

Carry over the total value price to QUOTATION FORM, page 6 under TOTAL QUOTED PRICE OF OPTION C.

**Option D – Minoru Boulevard & Westminster Highway to Cedarbridge Way RCMP**

A. Supply and install 48 and 12 fibre cables in conduit with existing cable as per drawings.  
Price per metre \_\_\_\_\_ x estimated quantity 500 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. In - Building termination – Supply and install Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)  
Total building termination locations = 1, (Cedarbridge RCMP Building).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. IT Cable – Terminate all strands from single packet In-Building communications room.  
Price per single strand termination \_\_\_\_\_ x quantity \_\_48\_\_ strands =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_.

D. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).  
Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 4 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

E. Supply and install underground fibre optic cable splice enclosures.  
Price per unit \_\_\_\_\_ x estimated quantity 1 =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Make and model of splice enclosure kit proposed )

F. Fibre optic cable splicing.

Price per single strand splice \_\_\_\_\_ x estimated quantity 12 fibres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable splicing shall be confined to individual buffer tubes containing 12 fibres per tube. Some or all fibres within these tubes shall be spliced. Splicing details will be finalized with the Contractor after the award of this Contract.)

**TOTAL VALUE OF OPTION D:**

**Subtotal\$** \_\_\_\_\_

**PST\$** \_\_\_\_\_

**GST \$** \_\_\_\_\_

**Total \$** \_\_\_\_\_

Carry over the total value price to QUOTATION FORM, page 6 under TOTAL QUOTED PRICE OF OPTION D.

**Option E – Link A – Thompson Community Centre to Fire Hall No. 2**

A. Supply and install 96 and 12 fibre cables in conduit with existing cable as per drawings.

Price per metre \_\_\_\_\_ x estimated quantity 4500 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. In - Building termination – Supply and install Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)

Total building termination locations = 2, (Thompson Community Centre, Outdoor termination Cabinet @ No. 2 & Steveston Hwy.).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. IT & Traffic Cable – Terminate all strands from single packet In-Building communications room.

Price per single strand termination \_\_\_\_\_ x quantity 96 strands =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_.

D. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 15 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_.

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

**Option E – Link B – No. 2 Road & Francis Road to West Richmond Community Centre**

A. Supply and install 48 and 12 fibre cables in conduit with existing cable as per drawings.

Price per metre \_\_\_\_\_ x estimated quantity 1900 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. In - Building termination – Supply and install Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)

Total building termination locations = 1, (West Richmond Community Centre).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. IT Cable – Terminate all strands from single packet In-Building communications room.

Price per single strand termination \_\_\_ x quantity \_\_48\_\_ strands =

Subtotal \$ \_\_\_\_\_ . PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

D. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 4 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

E. Supply and install underground fibre optic cable splice enclosures.

Price per unit \_\_\_\_\_ x estimated quantity 1 =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Make and model of splice enclosure kit proposed )

F. Fibre optic cable splicing.

Price per single strand splice \_\_\_\_\_ x estimated quantity 12 fibres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable splicing shall be confined to individual buffer tubes containing 12 fibres per tube. Some or all fibres within these tubes shall be spliced. Splicing details will be finalized with the Contractor after the award of this Contract.)(Make and model of splice enclosure kit proposed )

**Option E – Link C - Fire Hall No. 2 to Steveston Community Centre**

A. Supply and install 48 and 12 fibre cables in conduit with existing cable as per drawings.

Price per metre \_\_\_\_\_ x estimated quantity 3300 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. In - Building termination – Supply and install Commscope Systimax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)

Total building termination locations = 1 (Steveston Community Centre).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. IT Cable – Terminate all strands from single packet In-Building communications room.

Price per single strand termination \_\_\_\_\_ x quantity 48 strands =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

D. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 8 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

**TOTAL VALUE OF OPTION E**

**Subtotal\$**

**PST\$**

**GST \$**

**Total\$**

Carry over the total value price to QUOTATION FORM, page 6 under TOTAL QUOTED PRICE OF OPTION E.

**Option F – Fire Hall No. 2 to Ironwood Library**

A. Supply and install 48 and 12 fibre cables in conduit with existing cable as per drawings.

Price per metre \_\_\_\_\_ x estimated quantity 6000 metres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

B. In - Building termination – Supply and install Commscope Systemax # 600G2 1U and 2U (as appropriate at each location) fibre termination shelves (no alternates)

Total building termination locations = 1 (Ironwood Library).

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

C. IT Cable – Terminate all strands from single packet In-Building communications room.

Price per single strand termination \_\_\_\_\_ x quantity 48 strands =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_.

D. Traffic Signal Cable - Terminate selected strands from single packet in traffic signal cabinets – (minimum 4 to all 12 fibres).

Price per single strand termination \_\_\_\_\_ x quantity 12 strands = \$ \_\_\_\_\_ x quantity 16 single packet terminations =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

**TOTAL VALUE OF OPTION F:**

**Subtotal\$** \_\_\_\_\_

**PST\$** \_\_\_\_\_

**GST \$** \_\_\_\_\_

**Total\$** \_\_\_\_\_

Carry over the total value price to QUOTATION FORM, page 6 under TOTAL QUOTED PRICE OF OPTION F.

**Miscellaneous Unit Prices for Potential Additional Work or Change Order Items:**

1) Fibre optic cable splicing.

Price per single strand splice \_\_\_\_\_ x estimated quantity 12 fibres =

Subtotal \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable splicing shall be confined to individual buffer tubes containing 12 fibres per tube. Some or all fibres within these tubes shall be spliced. Splicing details will be finalized with the Contractor after the award of this Contract.)

2) In - Building termination – Supply and install Commscope Systemax # 600G2 1U and 2U fibre termination shelves. Quantity 1.

Unit price \$ \_\_\_\_\_ each PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

3) Quantity 4 (per termination closet location) of Commscope Teraspeed LC/LC 1.6mtr patch cords # FPCWLCLC22.

Unit price \$ \_\_\_\_\_ each PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

(Cable termination shall be confined to the single buffer tube containing 12 fibres. Some or all fibres within these tubes shall be terminated. Termination details will be finalized with the Contractor after the award of this Contract.)

4) Supply 60 fibre IT cable instead of 48 fibre cable with same specs and cable diameter as 48 fibre cable. Additional 12 fibres to remain unspliced and not terminated.

Price per metre \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

5) Supply 24 fibre traffic signal cable instead of 12 fibre cable with same specs and cable diameter as 12 fibre cable. Additional 12 fibres to remain unspliced and not terminated.

Price per cable metre \$ \_\_\_\_\_ PST \$ \_\_\_\_\_ GST \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

Do not carry over these miscellaneous unit prices to QUOTATION FORM.

## **General Conditions of the Contract**

### **1. Definitions**

The two parties to the Contract/Purchase Order are the Contractor and the City, defined as follows:

**The Contractor:** The successful bidder for the work upon receipt of a purchase order and/or written acceptance of his Quotation from the City.

**The City:** City of Richmond.

Acceptance of the City of Richmond's Purchase order deems acceptance of all conditions of the supply and installation contract.

### **2. Work to Satisfaction of City**

The whole of the works and the manner of performing this Contract shall be done to the entire satisfaction and approval of the City, and it shall be the sole judge of the work and materials in respect of both quality and quantity, and its decision with regard to work or materials, or as to the meaning and intention of this Contract, or any part or parts thereof, shall be binding and final upon the Contractor.

### **3. Work to be in Conformity with Contract Documents and Drawings**

All work shall be done in strict conformity with the Contract Documents and drawings which form a part of the Contract. The intent of the contract documents is to include all labour, materials, equipment, services, supplies and all the things necessary for the proper and complete execution of the work.

### **4. Permits**

The Contractor shall comply with all codes, laws, regulations, and ordinances which concern the work, and unless otherwise provided herein shall obtain and pay for all applicable permits, licences, and certificates.

### **5. Use of Premises**

The Contractor shall confine the use of the premises for his work as directed by the City and shall comply with regulations which govern the building or institution where the work is located.

### **General Conditions of the Contract (Cont'd)**

At the conclusion of the work, the Contractor shall clean up and remove all debris and rubbish to the satisfaction of the City.

#### **6. Light, Power, and Heat**

The City's supply of electrical energy will be available to the Contractor without charge.

The City's supply of water will be available to the Contractor without charge.

The Contractor, upon completion of the work, shall remove temporary connections and extension of services, leaving the existing structures and services undamaged.

#### **7. Warranty**

Unless otherwise specified, the Contractor warrants that only the best workmanship and materials will be employed and if, within a period of one (1) year from the date of acceptance of the work by the City, such work or supplies or any portion thereof are found by the City to be defective or faulty due to imperfect or bad workmanship or material, the Contractor agrees to replace such defective supplies and correct such defective work forthwith without expense to the City.

#### **8. Liens**

The Contractor shall fully indemnify the City from and against any and all liability or expenses by way of legal costs or otherwise in respect of any claim which may be made for a lien or charge at law or inequity or to any claim or liability under the Builders Lien Act, or to any attachment for debt, garnishee process, or otherwise.

#### **9. Patent Fees**

The Contractor shall pay all royalties and licence fees and shall save the City harmless from loss on account of suits or claims of infringement of patents in the doing of the work.

#### **10. Default**

(a) The City may, by notice of default to the Contractor, terminate the whole or any part of this Contract if the Contractor fails to perform any provision of this Contract within the time specified or to perform any other provision of this contract.

(b) In the event the City terminates this Contract in whole or in part as provided in clause (a), the City may procure supplies or services similar to those so



### **General Conditions of the Contract (Cont'd)**

terminated, and the Contractor shall be liable to the City for any excess costs for such similar supplies or services.

- (c) The Contractor shall not be liable for any excess costs under clause (b) if failure to perform the Contract arises by reason of strikes, lockouts, acts of God, or acts of the City.

#### **11. Taxes**

Unless otherwise provided herein, the Contractor shall pay all government sales or excise taxes in force at the date of the Agreement, provided that any increase or decrease in such taxes shall increase or decrease the amount due under the Contract accordingly. Invoices shall show the appropriate amounts for Goods and Services Taxes and Provincial Sales Taxes separately.

#### **12. Laws**

The laws of British Columbia shall govern the work.

Time

Time shall be the essence in this Contract.

#### **13. Assignment**

Neither party to the Contract shall assign the Contract without the written consent of the other.

#### **14. Notices**

Any notice required to be given in this Contract shall be deemed to be duly given to the City if sent by registered mail addressed to the City's Purchasing and Risk Manager at Richmond "City Hall, 6911 No. 3 Road, Richmond, BC V6Y 2C1" and to the Contractor if sent by registered mail addressed to the Contractor at the address set forth in the Quotation.

#### **15. Settlement of Complaints Re: Work**

If, in the opinion of the Manager Purchasing and Risk, the work is improperly, defectively, or insufficiently performed, or being performed, the Manager Purchasing and Risk may, in writing, order the Contractor to re-execute or correct the work in accordance with such order; and if the Contractor fails to comply with such order within ten working days, the Manager Purchasing and Risk may, at any time thereafter, execute or cause to be executed the order so given, and the Contractor

## **General Conditions of the Contract (Cont'd)**

shall, on demand, pay to the City of Richmond, all costs, damages, and expenses incurred in respect thereof or occasioned by reason of the non-compliance by the Contractor with any such orders; and if the Contractor fails to pay such costs, damages, and expenses, the City of Richmond may retain and deduct such costs, damages, and expenses from any amount then or thereafter payable to the Contractor under this Contract.

### **16. Personnel**

#### **1.1 Qualified Personnel**

The Contractor will provide only professional personnel who have the qualifications, experience and capabilities to perform the Work.

#### **1.2 Subcontractors**

The Contractor will perform the Work using its own personnel and those subcontractors as may be listed on the Quotation Form and approved by the City, and will bind all approved subcontractors to the terms of the Contract Documents, as applicable to the subcontractors work. The Contractor will be as fully responsible to the City for acts and omissions of subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Contractor.

#### **1.3 Replacement of Personnel or Sub-Contractors**

If the City reasonably objects to the performance, experience, qualifications or suitability of any of the Contractor's personnel or subcontractors then the Contractor will, on written request from the City, replace such personnel or subcontractors.

#### **1.4 City's Own Forces and Other Contractors**

The City may have its own work forces and other contractors on the site while the Work is under way. The City will coordinate the work of all contractors on the site and require their coordination with each other. The Contractor will report to the City and apparent deficiencies in other contractors' work which would affect the Work, immediately after the deficiencies come to the Contractor's attention.

### **17. Changes in the Work**

The City may make changes to the work; the Contract price, and time being adjusted accordingly. Except for emergencies, all changes will be made by written order.

## **General Conditions of the Contract (Cont'd)**

### **18. Protection**

The Contractor shall maintain protection of all his work and materials from damage and shall protect the City's and any adjoining property from injury due to the Contractor's work.

### **19. Payments**

The City shall make progress payments once a month for work completed and materials on the site upon receipt of the Contractor's invoice.

Except for the final payment, the City shall holdback 10% of the amount of progress claims. The City shall pay the holdback 55 days after completion of the work upon receipt of the contractor's written claim for final payment accompanied by a Statutory Declaration stating that the Contractor has discharged every obligation and paid or satisfied every just claim incurred by him in connection to the Contract, including claims by his subcontractors, and upon receipt of clearance from the Worksafe BC.

### **20. Indemnification and Insurance**

The Contractor will indemnify, hold, and save harmless the City from and against all claims, losses, damages, costs, actions, and other proceedings, made, sustained, brought or prosecuted in manner, based upon, occasioned by, attributable to any injury, including death, property damage, infringement, or damage arising from any act or omission of the Contractor, his employees, officers, volunteers, servants, or agents or persons from whom the Contractor has assumed responsibility in the performance or purported performance of this agreement.

The Contractor shall, at his own expense, through the terms of the contract secure, maintain, and pay for the following coverages:

- (a) Comprehensive General Liability Insurance with a limit of not less than \$5,000,000 inclusive per occurrence for bodily injury and property damage and \$5,000,000 for personal injury. The policy or policies shall cover all premises and operations necessary or incidental to the performance of this agreement and include but not necessarily be limited to the following coverages:
  1. Contractual liability assumed under this agreement.
  2. Contingent employer's liability with respect to operations of sub-contractors.
  3. Owner's protective liability.
  4. Cross liability.

**General Conditions of the Contract (Cont'd)**

5. Automobile liability (non-owned, hired).
  6. Completed operations liability 24 months after completed operations.
  7. Voluntary medical payments.
- (b) "Course of Construction" Property Damage Insurance covering all risks of physical loss or damage on an occurrence basis, including loss of use of property, and including losses or damage from flood or earthquake. The coverage provided shall amount to no less than 80% of the total value of the work done and material delivered to the site, or under the control of the Contractor, payable to the City and Contractor as their interests may appear, and protecting each in such terms as will preclude subrogation claims by the insurer against anyone insured thereunder.

The City, its officers, officials, and employees shall be added as an additional insured on all such policies. All such insurance provided by these policies shall be primary regardless of any insurance or self insurance that may be enforced at the time of any loss or claim that insures the City, its officers, officials, and employees.

The policy or policies shall be underwritten by an insurance company or companies licensed to do business in the Province of British Columbia and who meet with the reasonable approval of the City. Prior to the commencement of the work defined by this agreement, the Contractor shall furnish the City through the Office of the Manager Purchasing and Risk a certified original copy of all such policies as evidence that such insurance is in force. The Contractor agrees that such insurance policies cannot be cancelled, lapsed, or materially changed without at least 30 days' written notice to the City.

Maintenance of such insurance and the performance of the Contractor of his obligations under this clause shall not relieve the Contractor of liability under the indemnification provisions here and above set forth. The foregoing insurance provisions shall not limit the insurance required by Municipal, Provincial, or Federal law.

It shall be the full responsibility of the Contractor to determine whether any additional insurance coverage is necessary and advisable for its own protection and/or to fulfil its obligations under this Contract. Any such additional insurance shall be provided and maintained by the Contractor its own expense.

It is understood that this agreement is strictly between the Contractor and the City and the Contractor is an independent contractor for the City and no employment relationship, partnership, agency, or joint venture exists between the City, the employees of the Contractor and/or its agents and/or their employees, and/or its Contractors and/or their employees. Any disputes between the Contractor and any of

### **General Conditions of the Contract (Cont'd)**

its employees and/or its agents and/or their employees and/or their Contractors and/or their employees shall be resolved by the Contractor with no involvement by the City.

#### **21. Worksafe BC Coverage/Prime Contractor**

The Contractor agrees that it shall at its own expense procure and carry or cause to be procured and carried and paid for, full Worksafe BC coverage for itself and all workers, employees, servants and others engaged in or upon any work or service which is the subject of this contract. The Contractor agrees that the City has the unfettered right to set off the amount of the unpaid premiums and assessments for such Worksafe BC coverage against any monies owing by the City to the Contractor. The City shall have the right to withhold payment under this contract until the Worksafe BC premiums, assessments or penalties in respect of work done or service performed in fulfilling this contract had been paid in full.

The Contractor agrees that it is the Prime Contractor for the purposes of the Worksafe BC Occupational Health and Safety Regulations for the Province of British Columbia. The Contractor shall have a safety program acceptable to the Worksafe BC and shall ensure that all Worksafe BC safety rules and regulations are observed during performance of this contract, not only by the Contractor but by all subcontractors, workers, material men and others engaged in the performance of this contract. Prior to commencement of construction, the Contractor shall complete and file a "Construction Notice of Project" with the Worksafe BC and shall provide a copy of the same to the City confirming that the Contractor shall be the Prime Contractor responsible for coordination of safety and health under Part 3 of the Workers Compensation Act and Part 20 of the WCB Occupational Health and Safety Regulations.

The Contractor shall provide the City with the Contractor's Worksafe BC registration number and a letter from the Worksafe BC confirming that the Contractor is registered in good standing with the Worksafe BC and that all assessments have been paid to the date thereof prior to the City having any obligation to pay monies under this contract. The Contractor shall also provide a signed copy of the Prime Contractor Designation Document.

The Contractor shall indemnify the City and hold harmless the City from all manner of claims, demands, costs, losses, penalties and proceedings arising out of or in any way related to unpaid Worksafe BC assessments owing from any person or corporation engaged in the performance of this contract or arising out of or in any way related to the failure to observe safety rules, regulations and practices of the Worksafe BC, including penalties levied by the Worksafe BC.

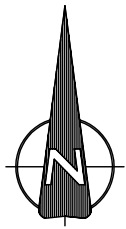
**General Conditions of the Contract (Cont'd)**

**22. No Promotion Of Relationship with the City, the O Zone or the 2010 Olympic and Paralympic Winter Games**

The Contractor shall not disclose or promote the Contractor's relationship with the City, the "O Zone" or "The Olympic Expo 2010 - Richmond", including by means of any verbal declarations, announcements, sales, marketing or other literature, letters, client lists, press releases, websites, brochures or other written or electronic materials (the "Communications") (except as may be reasonably necessary for the Contractor to perform the Contractor's obligations under the terms of this Agreement), without the express prior written consent of the City, which consent may be withheld.

Furthermore, the Contractor undertakes not to disclose or promote the Contractor's relationship with the City, the O Zone or The Olympic Expo 2010 - Richmond in a manner which could suggest or create an association, express or implied, between the Contractor and the International Olympic Committee ("IOC"), the 2010 Olympic and Paralympic Winter Games, the Olympic Movement or the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games ("VANOC"). Without limiting the generality of the foregoing, the Contractor shall not refer to "VANOC", "Vancouver 2010", the "2010 Games", the "Games", "Venue City", " O Zone", "Olympic", "Richmond Olympic Oval" or "Olympics" (or any derivatives thereof), and shall not use any official emblem, logo or mascot of the 2010 Games, the IOC or the City of Richmond, in any Communications (except as may be reasonably necessary for the Contractor to perform the Contractor's obligations under the terms of this Agreement), without the express prior written consent of the City, which consent may be withheld.





- 37 JB #37
- 66 JB #66
- 86 JB #5686
- v VAULT
- x COMMUNICATION JB
- s COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

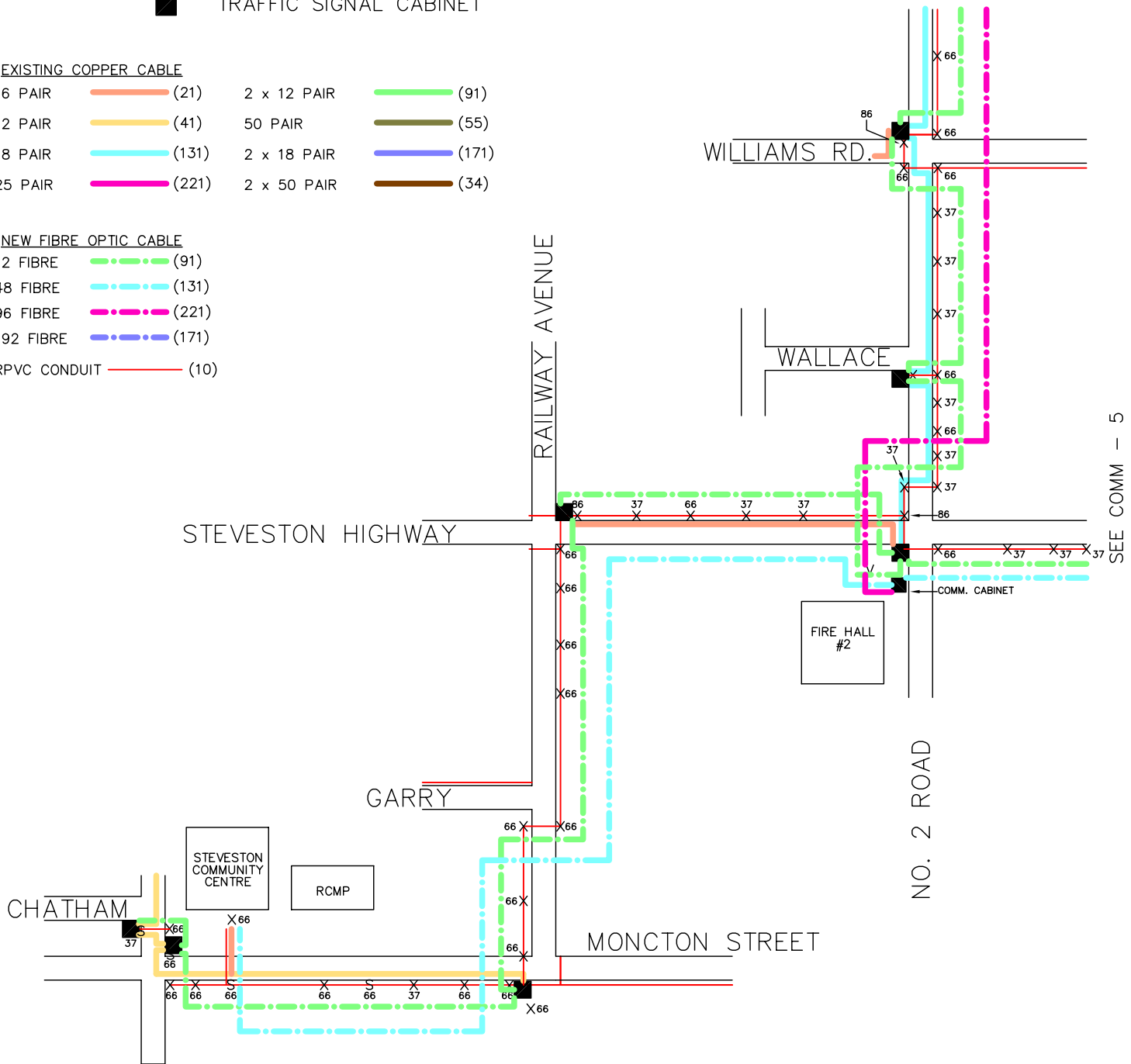
SEE COMM - 3

EXISTING COPPER CABLE

- |         |       |             |       |
|---------|-------|-------------|-------|
| 6 PAIR  | (21)  | 2 x 12 PAIR | (91)  |
| 12 PAIR | (41)  | 50 PAIR     | (55)  |
| 18 PAIR | (131) | 2 x 18 PAIR | (171) |
| 25 PAIR | (221) | 2 x 50 PAIR | (34)  |

NEW FIBRE OPTIC CABLE

- 12 FIBRE (91)
- 48 FIBRE (131)
- 96 FIBRE (221)
- 192 FIBRE (171)
- RPVC CONDUIT (10)



- x COMMUNICATION JB
- COMMUNICATION JB WITH ELBOW
- s COMMUNICATION JB WITH SPLICE

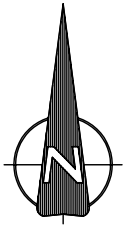
CITY OF RICHMOND

DES: J.R.B.	ENG:
DR: BJ	DATE: OCT./09
CHK:	SCALE: N.T.S.

COMMUNICATIONS CONDUIT/CABLE NETWORK  
CONTROLLERS, JUNCTION BOXES  
& CABLE SPLICE POINTS

DR. No. COMM-2
SHEET No. 1 OF 1





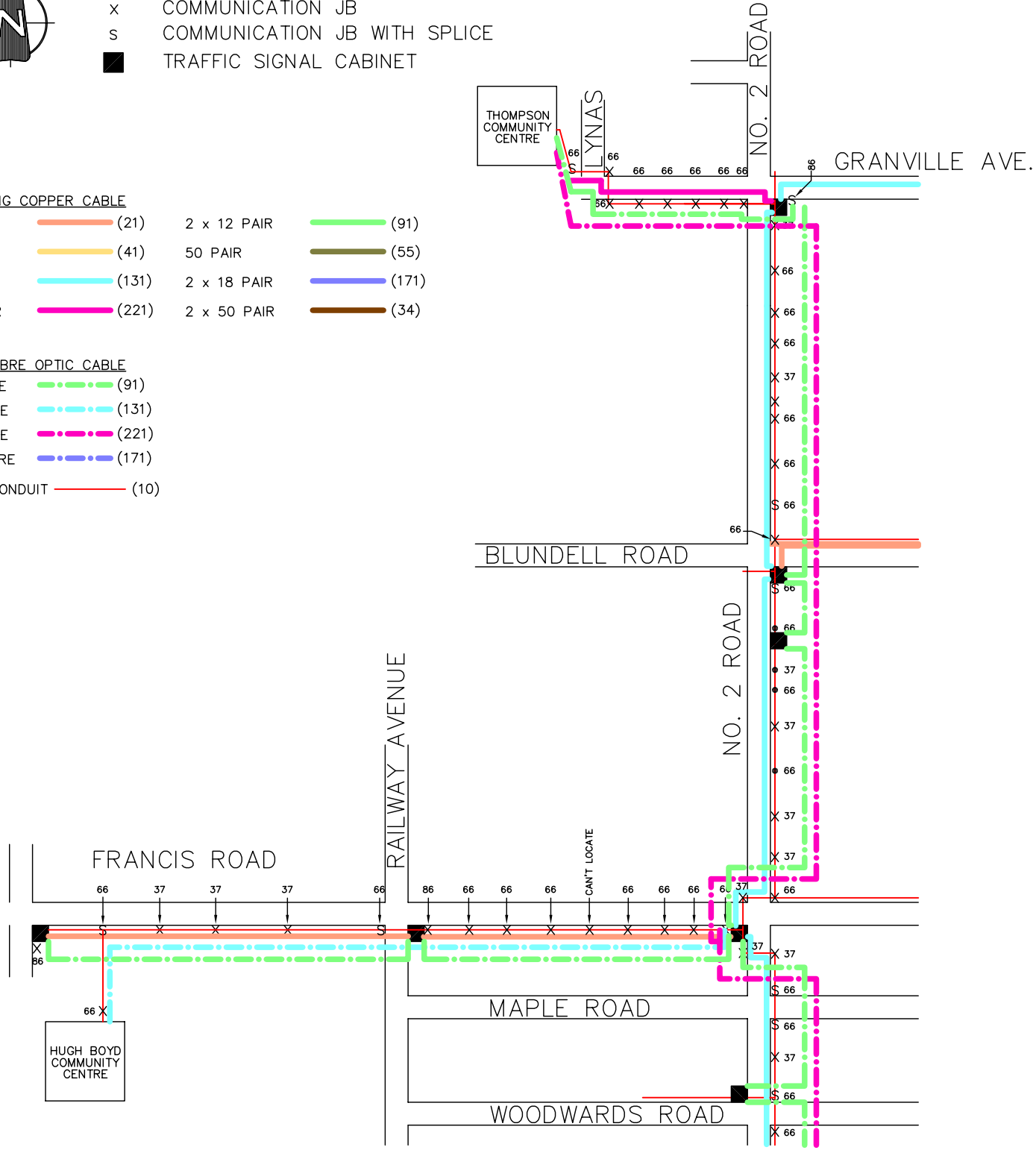
- 37 JB #37
- 66 JB #66
- 86 JB #5686
- v VAULT
- x COMMUNICATION JB
- s COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

EXISTING COPPER CABLE

- |         |  |       |             |  |       |
|---------|--|-------|-------------|--|-------|
| 6 PAIR  |  | (21)  | 2 x 12 PAIR |  | (91)  |
| 12 PAIR |  | (41)  | 50 PAIR     |  | (55)  |
| 18 PAIR |  | (131) | 2 x 18 PAIR |  | (171) |
| 25 PAIR |  | (221) | 2 x 50 PAIR |  | (34)  |

NEW FIBRE OPTIC CABLE

- 12 FIBRE (91)
- 48 FIBRE (131)
- 96 FIBRE (221)
- 192 FIBRE (171)
- RPVC CONDUIT (10)



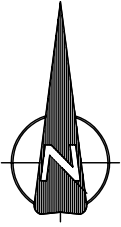
SEE COMM - 2

CITY OF RICHMOND

COMMUNICATIONS CONDUIT/CABLE NETWORK  
 CONTROLLERS, JUNCTION BOXES  
 & CABLE SPLICE POINTS

DES: J.R.B.	ENG:
DR: S.A.H.	DATE: SEPT/98
CHK:	SCALE: N.T.S.

DR. No. COMM-3
SHEET No. 1 OF 1

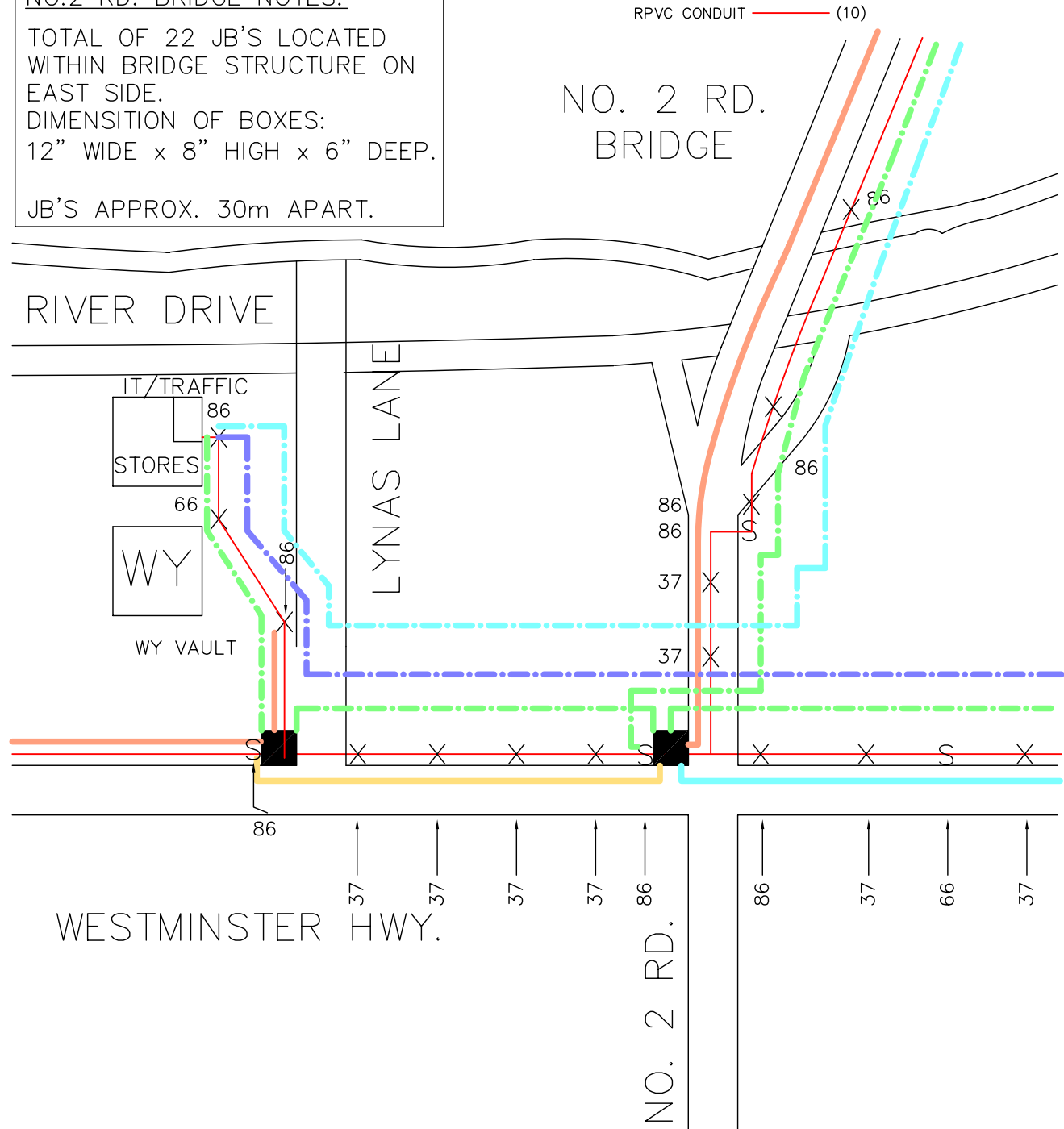


- 37 JB #37
- 66 JB #66
- 86 JB #5686
- v VAULT
- x COMMUNICATION JB
- s COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

- EXISTING COPPER CABLE**
- 6 PAIR (21) 2 x 12 PAIR (91)
  - 12 PAIR (41) 50 PAIR (55)
  - 18 PAIR (131) 2 x 18 PAIR (171)
  - 25 PAIR (221) 2 x 50 PAIR (34)

- NEW FIBRE OPTIC CABLE**
- 12 FIBRE (91)
  - 48 FIBRE (131)
  - 192 FIBRE (171)

NO.2 RD. BRIDGE NOTES:  
 TOTAL OF 22 JB'S LOCATED WITHIN BRIDGE STRUCTURE ON EAST SIDE.  
 DIMENSION OF BOXES: 12" WIDE x 8" HIGH x 6" DEEP.  
 JB'S APPROX. 30m APART.



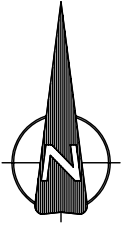
SEE COMM - 7

CITY OF RICHMOND

DES: J.R.B.	ENG:
DR: BJ	DATE: SEPT/02
CHK:	SCALE: N.T.S.

COMMUNICATIONS CONDUIT/CABLE NETWORK  
 CONTROLLERS, JUNCTION BOXES  
 & CABLE SPLICE POINTS

DR. No. COMM-4
SHEET No. 1 OF 1



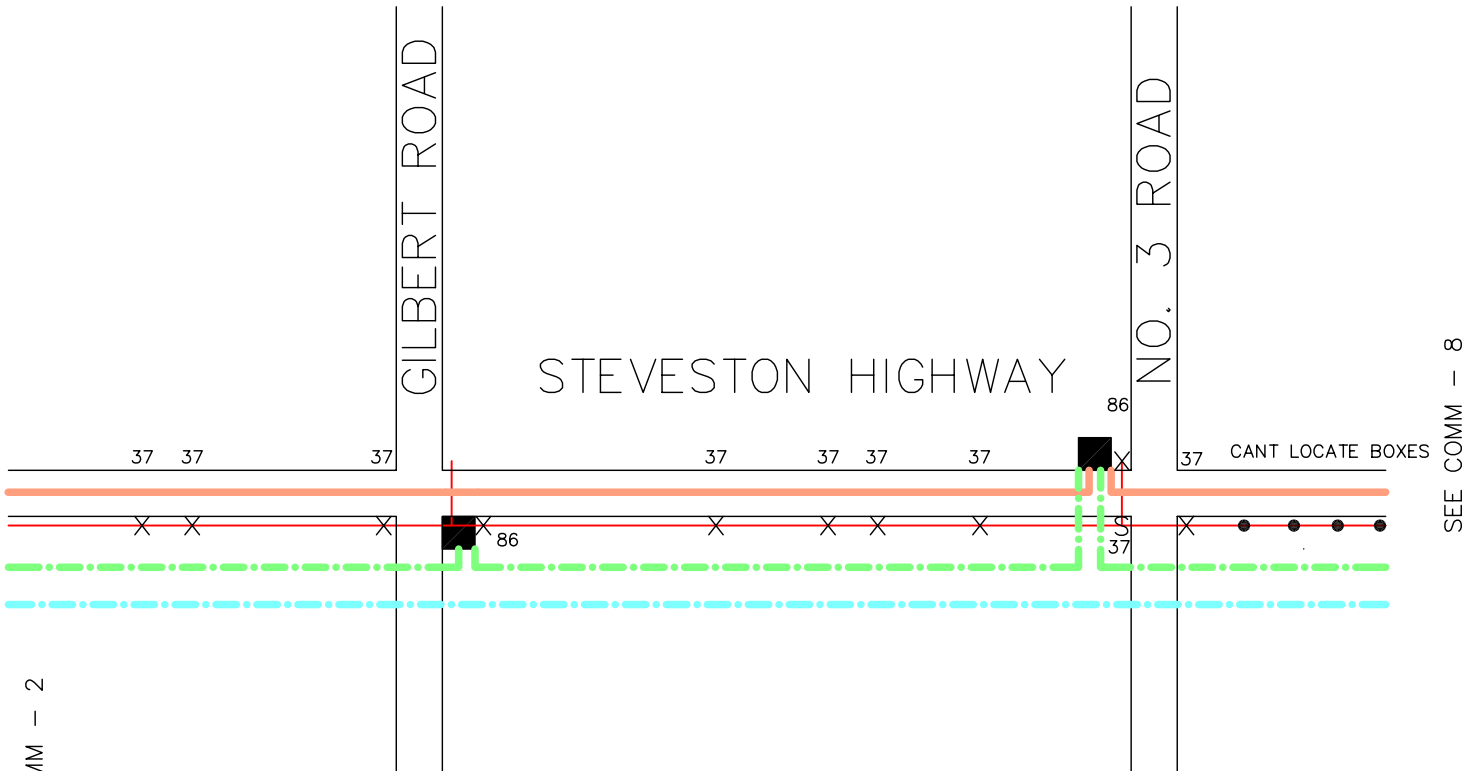
- 37 JB #37
- 66 JB #66
- 86 JB #5686
- v VAULT
- x COMMUNICATION JB
- s COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

EXISTING COPPER CABLE

- 6 PAIR (21) 2 x 12 PAIR (91)
- 12 PAIR (41) 50 PAIR (55)
- 18 PAIR (131) 2 x 18 PAIR (171)
- 25 PAIR (221) 2 x 50 PAIR (34)

NEW FIBRE OPTIC CABLE

- 12 FIBRE (91)
- 48 FIBRE (131)
- 96 FIBRE (221)
- 192 FIBRE (171)
- RPVC CONDUIT (10)



SEE COMM - 2

SEE COMM - 8

CITY OF RICHMOND

COMMUNICATIONS CONDUIT/CABLE NETWORK  
CONTROLLERS, JUNCTION BOXES  
& CABLE SPLICE POINTS

DES: J.R.B.

ENG:

DR: B.J.

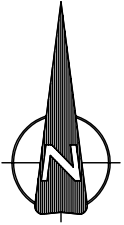
DATE: OCT./09

CHK:

SCALE: N.T.S.

DR. No.  
COMM-5

SHEET No.  
1 OF 1



- 37 JB #37
  - 66 JB #66
  - 86 JB #5686
  - v VAULT
  - x COMMUNICATION JB
  - s COMMUNICATION JB WITH SPLICE
  - TRAFFIC SIGNAL CABINET
- SEE COMM - 7

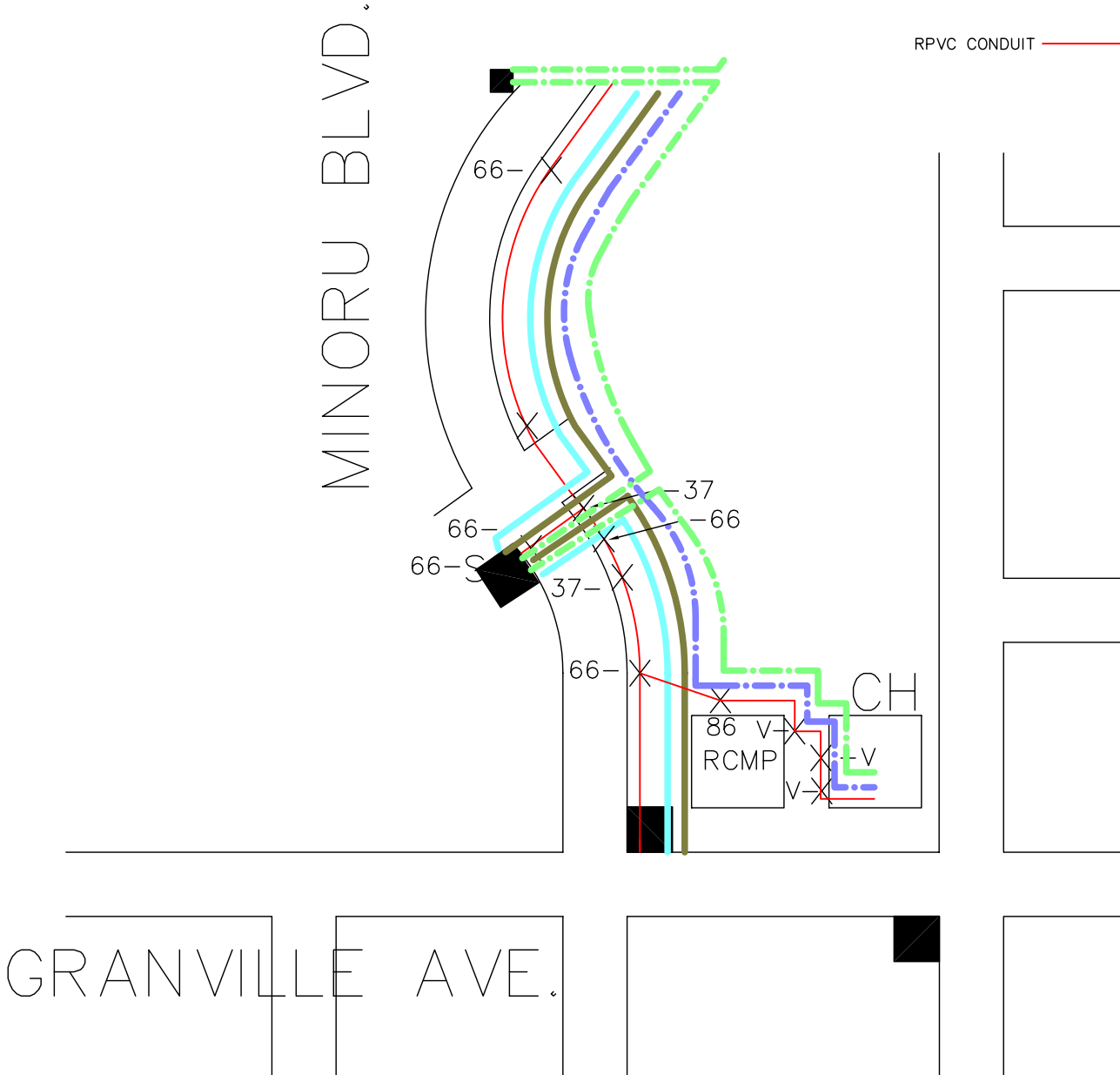
EXISTING COPPER CABLE

- 6 PAIR (21) 2 x 12 PAIR (91)
- 12 PAIR (41) 50 PAIR (55)
- 18 PAIR (131) 2 x 18 PAIR (171)
- 25 PAIR (221) 2 x 50 PAIR (34)

NEW FIBRE OPTIC CABLE

- 12 FIBRE (91)
- 48 FIBRE (131)
- 192 FIBRE (171)

RPVC CONDUIT (10)



CITY OF RICHMOND

COMMUNICATIONS CONDUIT/CABLE NETWORK  
 CONTROLLERS, JUNCTION BOXES  
 & CABLE SPLICE POINTS

DES: J.R.B.

ENG:

DR: B.J.

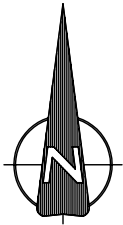
DATE: OCT./09

CHK:

SCALE: N.T.S.

DR. No.  
COMM-6

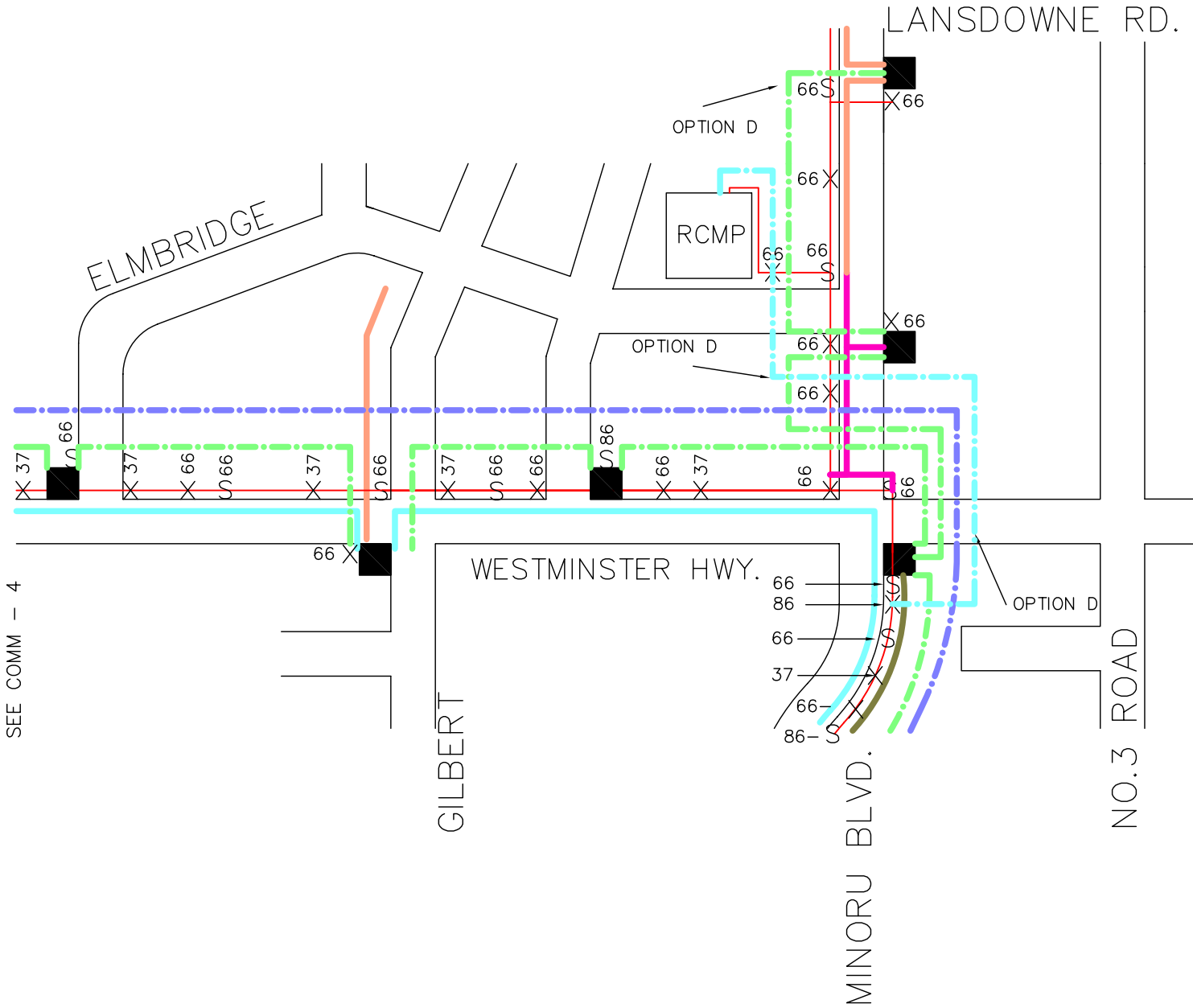
SHEET No.  
1 OF 1



- 37 JB #37
- 66 JB #66
- 86 JB #5686
- RP ROUND #10 JB
- V VAULT
- X COMMUNICATION JB
- S COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

- EXISTING COPPER CABLE
- 6 PAIR (21) — 2 x 12 PAIR (91) —
  - 12 PAIR (41) — 50 PAIR (55) —
  - 18 PAIR (131) — 2 x 18 PAIR (171) —
  - 25 PAIR (221) — 2 x 50 PAIR (34) —

- NEW FIBRE OPTIC CABLE
- 12 FIBRE (91) - - -
  - 48 FIBRE (131) - - -
  - 192 FIBRE (171) - - -
- RPVC CONDUIT (10) —

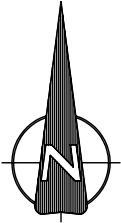


CITY OF RICHMOND

COMMUNICATIONS CONDUIT/CABLE NETWORK  
CONTROLLERS, JUNCTION BOXES  
& CABLE SPLICE POINTS

DES: J.R.B.	ENG:
DR: B.J.	DATE: OCT./09
CHK:	SCALE: N.T.S.

DR. No. COMM-7
SHEET No. 1 OF 1



- 37 JB #37
- 66 JB #66
- 86 JB #5686
- RP ROUND #10
- X COMMUNICATION JB
- S COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

EXISTING COPPER CABLE

- 6 PAIR (21) 2 x 12 PAIR (91)
- 12 PAIR (41) 50 PAIR (55)
- 18 PAIR (131) 2 x 18 PAIR (171)
- 25 PAIR (221) 2 x 50 PAIR (34)

NEW FIBRE OPTIC CABLE

- 12 FIBRE (91)
- 48 FIBRE (131)
- 96 FIBRE (221)
- 192 FIBRE (171)
- RPVC CONDUIT (10)

SEE COMM - 5

CANT LOCATE BOX

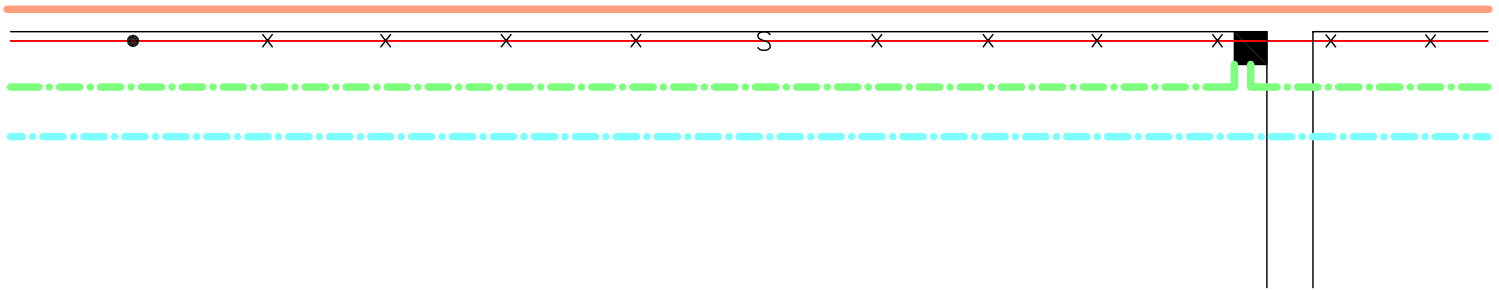
STEVESTON HIGHWAY

CANT LOCATE BOX

NO. 4 ROAD

SEE COMM - 12

37 86 37 37 RP 37 37 86 66 37

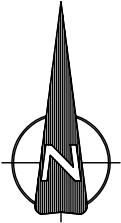


CITY OF RICHMOND

COMMUNICATIONS CONDUIT/CABLE NETWORK  
 CONTROLLERS, JUNCTION BOXES  
 & CABLE SPLICE POINTS

DES: J.R.B.	ENG:
DR: BJ	DATE: OCT./09
CHK:	SCALE: N.T.S.

DR. No. COMM-8
SHEET No. 1 OF 1



- 37 JB #37
- 66 JB #66
- 86 JB #5686
- RP ROUND #10
- X COMMUNICATION JB
- S COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

EXISTING COPPER CABLE

- 6 PAIR (21) 2 x 12 PAIR (91)
- 12 PAIR (41) 50 PAIR (55)
- 18 PAIR (131) 2 x 18 PAIR (171)
- 25 PAIR (221) 2 x 50 PAIR (34)

NEW FIBRE OPTIC CABLE

- 12 FIBRE (91)
- 48 FIBRE (131)
- 96 FIBRE (221)
- 192 FIBRE (171)
- RPVC CONDUIT (10)

SEE COMM - 5

CANT LOCATE BOX

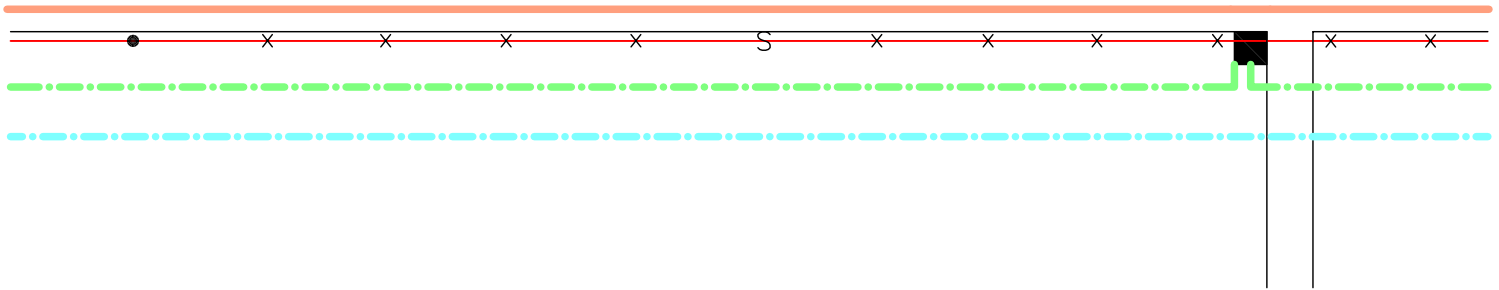
STEVESTON HIGHWAY

CANT LOCATE BOX

NO. 4 ROAD

SEE COMM - 12

37 86 37 37 RP 37 37 86 66 37

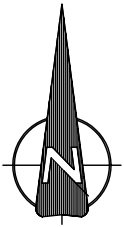


CITY OF RICHMOND

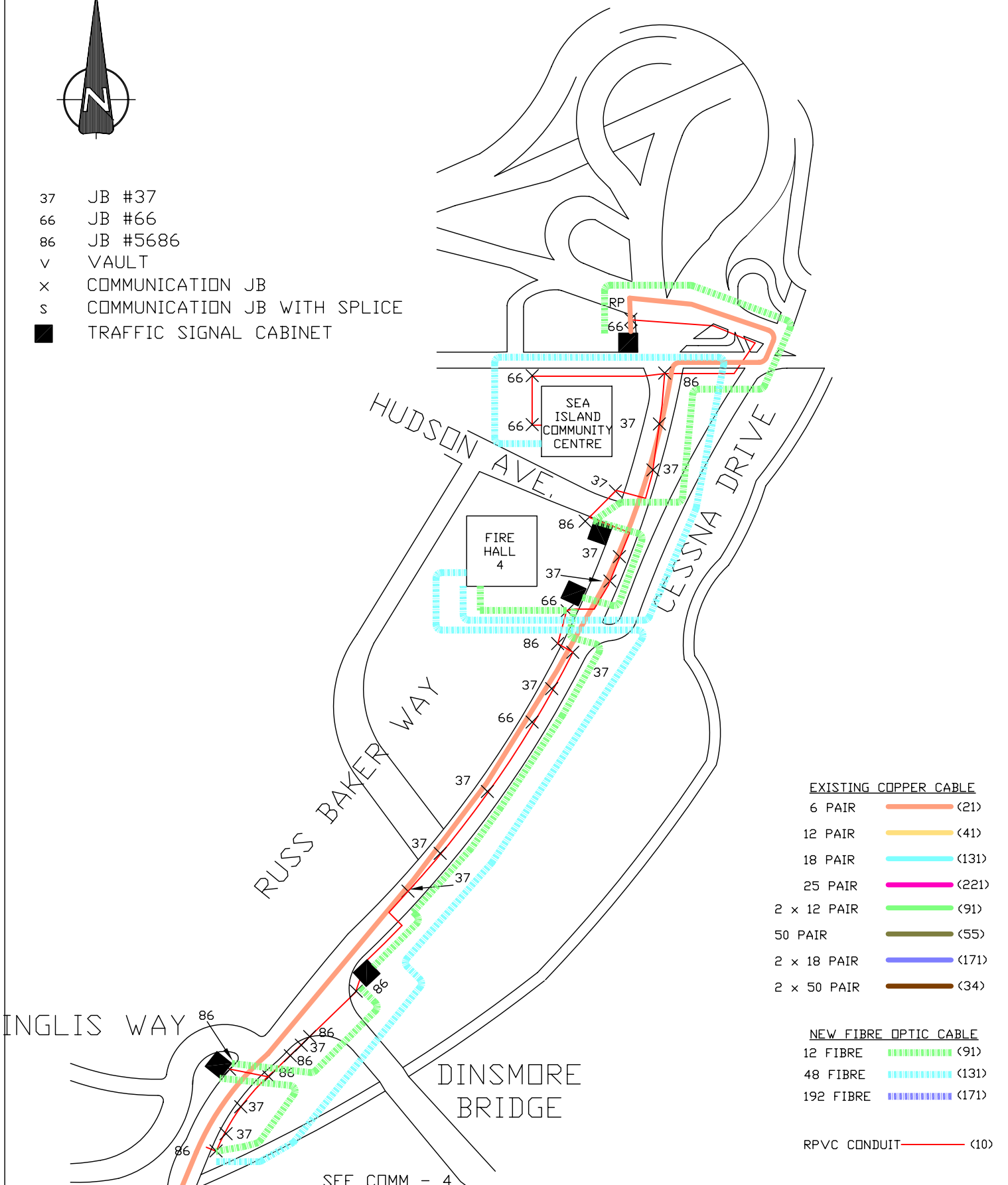
COMMUNICATIONS CONDUIT/CABLE NETWORK  
 CONTROLLERS, JUNCTION BOXES  
 & CABLE SPLICE POINTS

DES: J.R.B.	ENG:
DR: BJ	DATE: OCT./09
CHK:	SCALE: N.T.S.

DR. No. COMM-8
SHEET No. 1 OF 1



- 37 JB #37
- 66 JB #66
- 86 JB #5686
- v VAULT
- x COMMUNICATION JB
- s COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET



- EXISTING COPPER CABLE**
- 6 PAIR (21)
  - 12 PAIR (41)
  - 18 PAIR (131)
  - 25 PAIR (221)
  - 2 x 12 PAIR (91)
  - 50 PAIR (55)
  - 2 x 18 PAIR (171)
  - 2 x 50 PAIR (34)
- NEW FIBRE OPTIC CABLE**
- 12 FIBRE (91)
  - 48 FIBRE (131)
  - 192 FIBRE (171)
- RPVC CONDUIT (10)

SEE COMM - 4

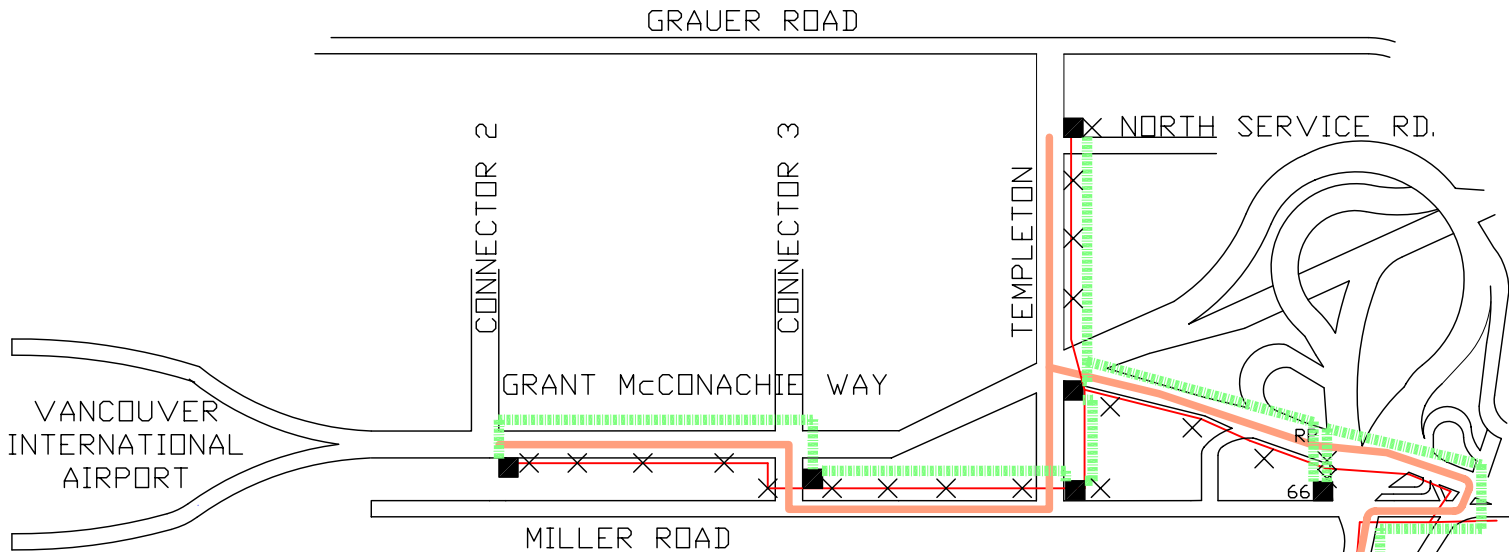
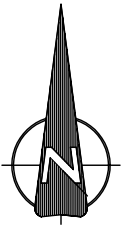
CITY OF RICHMOND

DES: J.R.B.	ENG:
DR: BJ	DATE: OCT./09
CHK:	SCALE: N.T.S.

COMMUNICATIONS CONDUIT/CABLE NETWORK  
CONTROLLERS, JUNCTION BOXES  
& CABLE SPLICE POINTS

DR. No. COMM-18A
SHEET No. 1 OF 1





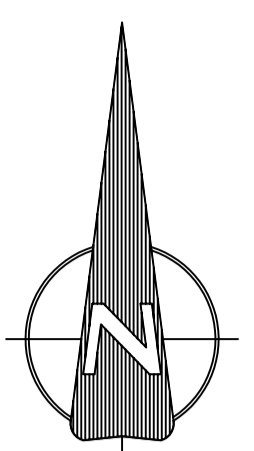
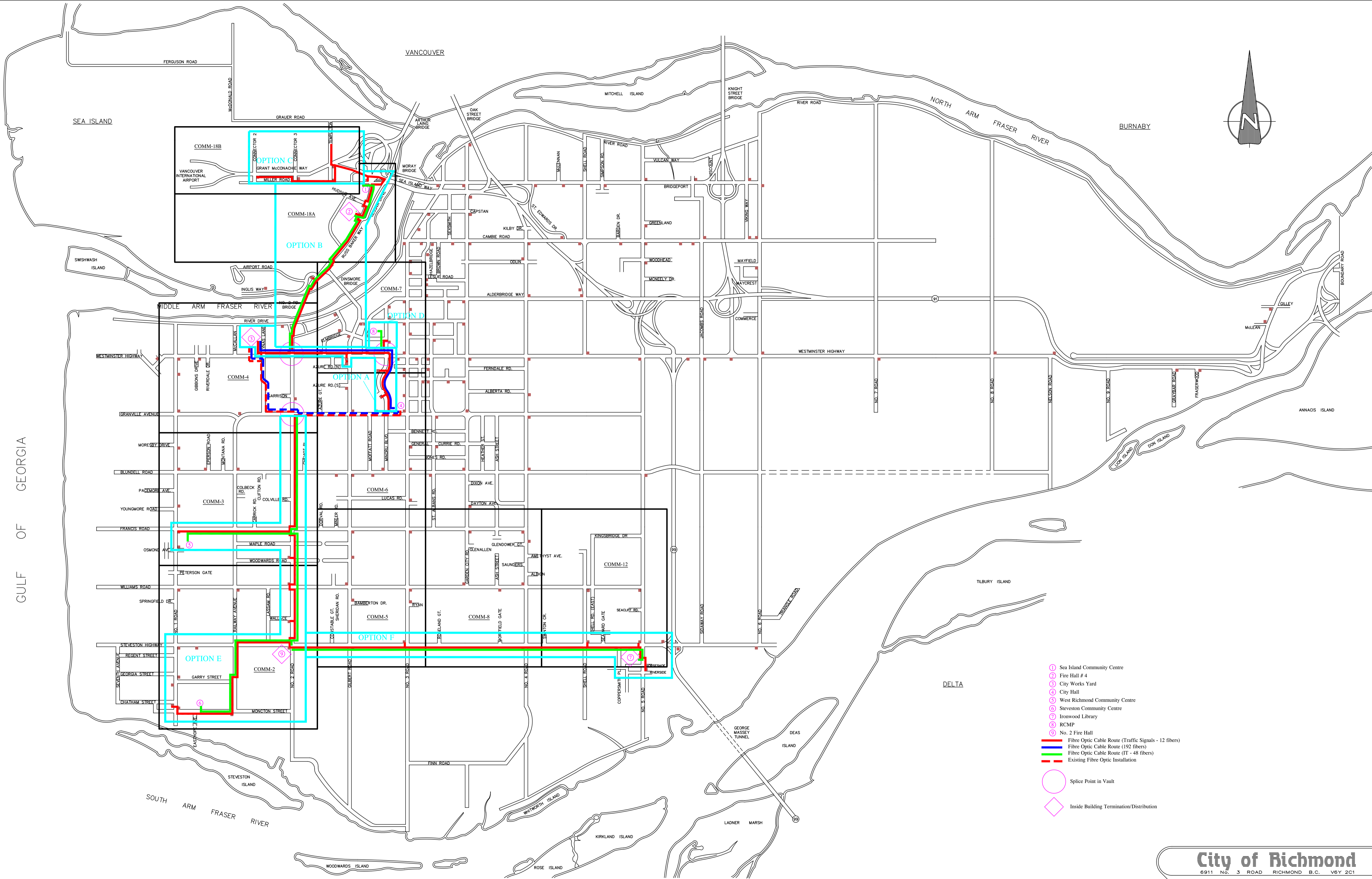
**OPTION C NOTES:**  
 JUNCTION BOX SIZE AND LOCATION TO BE VERIFIED IN FIELD.  
 (NUMBER, SIZE AND LOCATION SHOWN ON DRAWINGS IS AN ESTIMATE ONLY).

- EXISTING COPPER CABLE**
- 6 PAIR (21)
  - 12 PAIR (41)
  - 18 PAIR (131)
  - 25 PAIR (221)
  - 2 x 12 PAIR (91)
  - 50 PAIR (55)
  - 2 x 18 PAIR (171)
  - 2 x 50 PAIR (34)
- NEW FIBRE OPTIC CABLE**
- 12 FIBRE (91)
  - 48 FIBRE (131)
  - 192 FIBRE (171)
- RPVC CONDUIT (10)

- 37 JB #37
- 66 JB #66
- 86 JB #5686
- v VAULT
- x COMMUNICATION JB
- s COMMUNICATION JB WITH SPLICE
- TRAFFIC SIGNAL CABINET

CITY OF RICHMOND

DES: J.R.B.	ENG:	COMMUNICATIONS CONDUIT/CABLE NETWORK CONTROLLERS, JUNCTION BOXES & CABLE SPLICE POINTS	DR. No. COMM-18B
DR: BJ	DATE: OCT./09		SHEET No.
CHK:	SCALE: N.T.S.		1 OF 1



- ① Sea Island Community Centre
- ② Fire Hall # 4
- ③ City Works Yard
- ④ City Hall
- ⑤ West Richmond Community Centre
- ⑥ Steveston Community Centre
- ⑦ Ironwood Library
- ⑧ RCMP
- ⑨ No. 2 Fire Hall
- Fibre Optic Cable Route (Traffic Signals - 12 fibers)
- Fibre Optic Cable Route (192 fibers)
- Fibre Optic Cable Route (IT - 48 fibers)
- Existing Fibre Optic Installation
- Splice Point in Vault
- ◇ Inside Building Termination/Distribution

**City of Richmond**  
 6911 No. 3 Road Richmond B.C. V6Y 2C1

TITLE:  CONTRACT 3215 FIBRE CABLE ROUTING		
DESIGN: J.R.B.	DWG. No: MAP-3215	
DRAWN: S.L.M.	SCALE: N.T.S.	DATE: OCTOBER 2009
CHECKED:	SEC. No:	SHT. No: fibrecontract.ctb
ENGINEER:		