

ADDENDUM THREE  
to the  
CONTRACT DOCUMENTS  
for  
CITY OF MOOSE JAW  
2017 CAST IRON WATERMAIN REPLACEMENT PROGRAM

April 18, 2017

To All Bidders:

The following changes, additions, and/or deletions are hereby made a part of the Contract Documents for the City of Moose Jaw, 2017 Cast Iron Watermain Replacement Program, March, 2017 as fully and completely as if the same were fully set forth therein:

**CLARIFICATION(S) TO BID DOCUMENTS**

*The following is a list of questions/clarifications requested during the tender process:*

1. On Site # 3 – 3<sup>rd</sup> Ave NW there is 250 mm HDPE pipe called for pipe bursting. On the Tender Form under Section 1.2 there is no payment item for 250 mm HDPE Pipe. Can you clarify.

Answer – Addendum Three has included an updated Bid Form Item 1.2.2 - 250 mm HDPE.

2. I'm looking for confirmation as to which service box we need to use for this project. See below for the two types:
  - 1) City of Regina service box 7-9.5 bury
  - 2) City of Moose Jaw service box 8-9 bury VSB1

Answer – The service box must comply with Section 3.3.1 Curb Stops and Boxes.

3. Under the Watermain PVC pipe section this tender requests 375 mm pipe they do not make C900 or C905 in 15”.

Answer – 375 mm pipe will be replaced in the contract with 400 mm PVC pipe. Section 2.3 Polyvinyl Chloride (PVC) Pipe has been amended to include 400 mm diameter PVC pipe. The Bid Form has been updated to reflect changes to items 1.1.5, 1.4.1.9 and 1.4.1.10.

4. As a follow-up to our telephone conversation, KMS Construction Ltd. Would like to request an extension to the closing date from April 18<sup>th</sup> to April 25<sup>th</sup>, 2017 for the above captioned Tender. With the Tender period running through the Easter Weekend and some issues with getting the best pricing from our suppliers because of this holiday weekend,

we would like to request the one (1) week extension to the closing date to ensure we can get the best pricing on materials for this tender.

Answer – Tender has been extended one week (closing April 25<sup>th</sup>, 2017).

**All Bidders shall acknowledge receipt and acceptance of this Addendum by signing in the space provided and submitting the signed signature page of the Addendum to the Engineer at any time prior to Bid Closing Time.** Submission of the signature page in hard copy, via fax or via email is acceptable. Bids submitted without acknowledgement of receipt of this Addendum may be considered incomplete.

Yours truly,

ASSOCIATED ENGINEERING (SASK.) LTD.



Mike Binns, P.Eng.  
Project Manager

Receipt acknowledged and conditions agreed to this \_\_\_\_ day of \_\_\_\_\_, 2017.

\_\_\_\_\_  
Bidder

\_\_\_\_\_  
Signature

Appended hereto and part of this Addendum:

- Section (s)
  - Minutes from Bidder's Briefing on April 13, 2017
  - Bid Form R1
  - Specifications

**CONTRACT DOCUMENT REVIEW**

We \_\_\_\_\_  
(Company Name)

of \_\_\_\_\_  
(Business Address)

Having carefully examined the documents of this tender; hereby offer to enter into a contract to perform all the work described and supply all the materials and conform to all the conditions for the prices stated in the UNIT PRICES section of the Bid Form.

**ADDENDA ACKNOWLEDGEMENT**

Addendum Number	Date

**UNIT PRICES**

Enter Goods &amp; Services Tax (GST) and Provincial Sales Tax (PST) in the space provided.

<b>Item</b>	<b>Description</b>	<b>Specification Reference Section</b>	<b>Units</b>	<b>Estimated Quantity</b>	<b>Unit Price \$</b>	<b>Amount \$</b>
<b>1</b>	<b>WATERMAINS</b>	<b>2.0</b>				
1.1	Potable Water Main Installation – Trench Excavation (caged narrow trench 3.0 m)	2.0				
1.1.1	150 mm PVC Hydrant Lead	2.3	lin. m	168		
1.1.2	200 mm PVC pipe	2.3	lin. m	918.3		
1.1.3	250 mm PVC pipe	2.3	lin. m	156.9		
1.1.4	300 mm PVC pipe	2.3	lin. m	665.6		
1.1.5	400 mm PVC pipe	2.3	lin. m	13		
1.2	Potable Water Main Installation – Pipe Bursting	2.4				
1.2.1	200 mm HDPE pipe	2.4.1	lin. m	486.1		
1.2.2	250 mm HDPE pipe	2.4.1	lin.m	156		
1.2.3	300 mm HDPE pipe	2.4.1	lin. m	317.9		
1.3	Valves	2.6				
1.3.1	150 mm Gate Valve	2.6	ea	23		
1.3.2	200 mm Gate Valve	2.6	ea	16		
1.3.3	250 mm Gate Valve	2.6	ea	9		
1.3.4	300 mm Gate Valve	2.6	ea	12		
1.4	Fittings	2.7				
1.4.1	Tees	2.7				
1.4.1.1	200 x 200 x 150 mm	2.7	ea	15		
1.4.1.2	200 x 200 x 200 mm	2.7	ea	3		
1.4.1.3	250 x 250 x 150 mm	2.7	ea	6		
1.4.1.4	250 x 250 x 200 mm	2.7	ea	2		
1.4.1.5	250 x 250 x 250 mm	2.7	ea	2		
1.4.1.6	300 x 300 x 150 mm	2.7	ea	5		
1.4.1.7	300 x 300 x 200 mm	2.7	ea	4		

City of Moose Jaw, Saskatchewan

Item	Description	Specification Reference Section	Units	Estimated Quantity	Unit Price \$	Amount \$
1.4.1.8	300 x 300 x 300 mm	2.7	ea	1		
1.4.1.9	400 x 400 x 200 mm	2.7	ea	1		
1.4.1.10	400 x 400 x 250 mm	2.7	ea	1		
1.4.2	Crosses	2.7				
1.4.2.1	250 x 250 x 250 x 250 mm	2.7	ea	2		
1.4.2.2	250 x 300 x 250 x 300 mm	2.7	ea	1		
1.4.3	Bends	2.7				
1.4.3.1	5 Deg - 200 mm	2.7	ea	15		
1.4.3.2	22.5 Deg - 200 mm	2.7	ea	3		
1.4.3.3	45 Deg - 200 mm	2.7	ea	14		
1.4.3.4	45 Deg - 300 mm	2.7	ea	8		
1.4.3.5	90 Deg - 250 mm	2.7	ea	2		
1.4.3.6	90 Deg - 300 mm	2.7	ea	3		
1.4.3.7	Wye - 300 mm	2.7	ea	2		
1.4.4	Reducers	2.7				
1.4.4.1	200 x 150 mm	2.7	ea	7		
1.4.4.2	250 X 150 mm	2.7	ea	2		
1.4.4.3	250 x 200 mm	2.7	ea	1		
1.4.4.4	300 x 150 mm	2.7	ea	3		
1.4.4.5	300 x 250 mm	2.7	ea	1		
1.4.4.6	400 x 250 mm	2.7	ea	2		
1.4.5	Couplers	2.7				
1.4.5.1	150 mm	2.7	ea	12		
1.4.5.2	200 mm	2.7	ea	10		
1.4.5.3	250 mm	2.7	ea	11		
1.4.5.4	300 mm	2.7	ea	6		
1.4.6	HDPE to PVC Adapter (Pipe Restraint)	2.7				
1.4.6.1	200 x 200 mm	2.7	ea	4		
1.4.6.2	250 x 250 mm	2.7	ea	4		
1.4.6.3	300 x 300 mm	2.7	ea	2		

City of Moose Jaw, Saskatchewan

Item	Description	Specification Reference Section	Units	Estimated Quantity	Unit Price \$	Amount \$
1.4.7	Caps	2.7				
1.4.7.1	150 mm	2.7	ea	28		
1.4.7.2	200 mm	2.7	ea	14		
1.4.7.3	250 mm	2.7	ea	4		
1.4.7.4	300 mm	2.7	ea	21		
1.5	Fire Hydrant	2.8	ea	23		
1.6	Connection to Existing Watermains	2.11				
1.6.1	To 150 mm Cast Iron pipe	2.11	ea	10		
1.6.2	To 200 mm Cast Iron pipe	2.11	ea	5		
1.6.3	To 200 mm Asbestos Cement pipe	2.11	ea	1		
1.6.4	To 200 mm PVC pipe	2.11	ea	1		
1.6.5	To 250 mm pipe	2.11	ea	4		
1.6.6	To 300 mm Cast Iron pipe	2.11	ea	4		
1.7	Provisional Watermain Items	2.12				
1.7.1	Watermain Insulation	2.12	lin. m	180		
1.7.2	Unstable Material Provisions (Trench Bottom)	2.13				
1.7.2.1	Excavation to Waste	2.13	cu. m	135		
1.7.2.2	Geotextile Fabric	2.13	sq .m	580		
1.7.2.3	Class "B" Bedding	2.13	cu. m	135		
1.7.2.4	Crushed Rock	2.13	cu. m	135		
1.7.3	Unshrinkable fill	2.13	cu. m	135		
1.7.4	Supply of Temporary Water Outside of Isolation Zone	6.5	LS	1		
	<b>SUBTOTAL 1 - WATERMAINS</b>					
<b>2</b>	<b>SERVICE CONNECTIONS</b>	<b>3.0</b>				
2.1	Reconnect Existing Water Service In Trench	3.2				
2.1.1	19 mm Copper	3.2	ea	11		
2.1.2	25 mm Copper	3.2	ea	1		
2.1.3	50 mm Copper	3.2	ea	4		
2.1.4	150 mm AC	3.2	ea	2		

City of Moose Jaw, Saskatchewan

Item	Description	Specification Reference Section	Units	Estimated Quantity	Unit Price \$	Amount \$
2.2	Water Service Connection to Property line	3.3				
2.2.1	19 mm Copper Pipe	3.3	lin. m	1004.4		
2.3	19 mm Curb Stop	3.3	ea	98		
2.4	No Corrode Service Connection Replacement	3.4				
2.4.1	150 mm PVC	3.4	lin. m	756.5		
	<b>SUBTOTAL 2 - SERVICE CONNECTIONS</b>					
<b>3</b>	<b>ROADWORK</b>	<b>4.0</b>				
3.1	Asphalt Saw Cutting	4.1	lin. m	5245		
3.2	Asphalt Removal and Disposal	4.2	sq. m	8561		
3.3	Concrete Removal and Disposal	4.3				
3.3.1	Curb and Gutter	4.3	lin. m	63		
3.3.2	Concrete Walk, Curb and Gutter	4.3	lin. m	261		
3.4	Subgrade Prep (150 mm Depth)	4.4	sq. m	8561		
3.5	Sub-base Course	4.5				
3.5.1	250 mm Depth	4.5	sq. m	4951		
3.5.2	350 mm Depth	4.5	sq. m	3610		
3.6	Base Course (150 mm Depth)	4.5	sq. m	8561		
3.7	Hot Mix Asphalt Concrete	4.6				
3.7.1	60 mm Depth Type MJ2	4.6	sq. m	2307		
3.7.2	90 mm Depth Type MJ2	4.6	sq. m	2644		
3.7.3	110 mm Depth Type MJ2	4.6	sq. m	3610		
3.7.4	30 mm Asphalt Overlay Type MJ4	4.6	tonne	376		
3.8	Cast-in-Place Concrete	4.7				
3.8.1	Curb and Gutter	4.7	lin. m	312		
3.8.2	Concrete Walk	4.7.1	sq.m	432		
3.9	Provisional Roadwork Items	4.7.3				
3.9.1	20 MPa Concrete	4.7.3	cu .m	255		
3.9.2	Geotextile	4.7.3	sq. m	1230		
3.9.3	Asphalt Level Course	4.7.3	tonne	88		

City of Moose Jaw, Saskatchewan

Item	Description	Specification Reference Section	Units	Estimated Quantity	Unit Price \$	Amount \$
3.10	Asphalt Milling - City Retained Millings	4.7.3	tonne	375		
	<b>SUBTOTAL 3 - ROADWORK</b>					
<b>4</b>	<b>STORM SEWER</b>	<b>5.0</b>				
4.1	Catch Basin Lead Replacement c/w Removal, Disposal and Open Cut Trenching (caged narrow trench 3.0 m)	5.1				
4.1.1	150 mm CSP Catch Basin Lead Replacement with 250 mm PVC Ribbed	5.1	lin. m	313.9		
4.2	Remove and Replace Existing Catchbasin with Standard 900 mm Catchbasin	5.2.1	ea	32		
4.3	Frames and Covers	5.2.2				
4.3.1	F-35 Frame and Cover	5.2.2	ea	8		
4.3.2	F-36 Frame and Cover	5.2.2	ea	22		
4.3.3	F-51 Frame and Cover	5.2.2	ea	2		
	<b>SUBTOTAL 4 - STORM SEWER</b>					
<b>5</b>	<b>MISCELLANEOUS</b>	<b>6.0</b>				
5.1	Landscape Restoration	6.1	sq. m	361		
5.2	Tree Removal and Disposal	6.2	ea	7		
5.3	Mobilization & Demobilization	6.3	LS	5		
5.4	Traffic Accommodation	6.4	ea	5		
	<b>SUBTOTAL 5.0 - MISCELLANEOUS</b>					

TENDER PRICE ..... \$ \_\_\_\_\_

GOODS & SERVICES TAX (GST).....\$ \_\_\_\_\_

PROVINCIAL SERVICES TAX (PST) ..... \$ \_\_\_\_\_

**TOTAL PRICE** ..... \$ \_\_\_\_\_

**GST REGISTRATION NUMBER:** \_\_\_\_\_



All prices are in Canadian Funds and shall be effective at least sixty (60) calendar days from date of closing of call for tenders, only GST will be levied on the Contract price. The Contractor is responsible for the Provincial Sales Tax on materials used in the construction process and these costs should be included as part of the Contract price.

Unit Price and Total Price is requested, however, should there be any discrepancy or error in calculation of Total Price on the submitted bid, the stated Unit Price will be considered as the proposed bid submitted. The Total Price will be recalculated including the stated Unit Price indicated on the Bid Form to obtain the recalculated Total Price. The evaluation and the award of the tender will be based on the Unit Price stated on the bid form.





We hereby declare that:

- (a) we agree to perform the work in compliance with the required completion date in the Bid Documents.
- (b) no person, firm, or corporation other than the undersigned has any interest in this bid or in the proposed Contract for which this bid is made;
- (c) this Bid is open to acceptance for a period of sixty (60) calendar days from the tender closing date

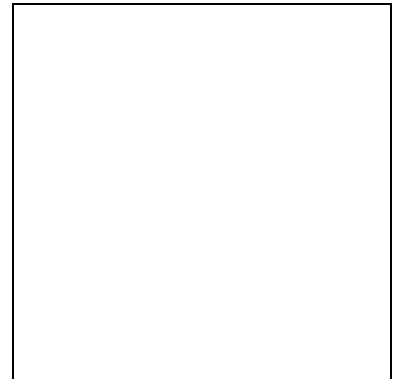
Signed, sealed, and submitted for and on behalf of:

Company: \_\_\_\_\_

(Name, Phone, & Email)

\_\_\_\_\_  
(Street Address/Postal Box Number)

\_\_\_\_\_  
(City, Province, & Postal Code)



Signature: \_\_\_\_\_

SEAL

Name & Title: \_\_\_\_\_

(Please Print)

Witness: \_\_\_\_\_

(Signature & Printed Name)

Date: at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.  
(location) (day) (month) (year)

Where legal jurisdiction or Owner requirement calls for proof of authority to execute this tender, proof of such authority in the form of a certified copy of a resolution naming the person or persons in question as authorized to sign this tender for on behalf of the corporation or partnership should be attached.

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## **1.0 GENERAL**

The Contractor shall be a licensed potable water installation Contractor. The Contractor shall be responsible for delegating and coordinating the work of all trades and SubContractors as well as the supply of all materials that shall produce a complete and operating job. The scope of any Division or Section shall not necessarily be the limits of a subcontract or trade, and the Engineer shall not be the arbiter to establish limits of contracts between Contractor and SubContractor.

The Contractor shall be responsible for ensuring that all his SubContractors and Suppliers are familiar with the codes, bylaws, specifications and other regulations governing their work. The Contractor shall examine all drawings before beginning the work and report to the Engineer any discrepancies or interferences. The Contractors shall coordinate all work to provide minimum interference and maximum useable space and in accordance with manufactures recommendations for safety, access and maintenance.

## **1.1 PRIME CONTRACTOR**

The Contractor is the “Prime Contractor” and the work of this Contract is to have primary responsibility for the safety of all the workers and the equipment. The City does not anticipate that there will be any Contractors, other than those performing the work of this Contract, engaged in work at the “work site” during the performance of the Work of this Contract.

## **1.2 STANDARD CONSTRUCTION SPECIFICATIONS AND DRAWINGS**

All referenced standards and specifications (i.e., Canadian Standards Associations (CSA), American Society for Testing Materials (ASTM) and such), that are referred to in these Contract Documents the current edition at the date of closing of tenders shall apply. Where there is a clear conflict between the Standard Specifications and the Contract Documents, the Contract Documents shall apply. Where there is ambiguity between the Standard Specifications and any term of these Contract Documents, the Engineer shall, in the first instance, give an interpretation of the intent of the Contract.

## **1.3 PROJECT CONTACT**

Inquiries regarding all aspects of the project shall be directed to:

Mike Binns, P. Eng.  
Project Manager

Office Fax: (306) 721-2474  
Email: [binnsm@ae.ca](mailto:binnsm@ae.ca)

#### **1.4 HOURS OF WORK**

The Contractor shall limit the work under this contract to the hours between 7:00 a.m. and 10:00 p.m. on non-statutory weekdays and between the hours 9:00 a.m. and 10:00 p.m. on Sundays and Statutory holidays. The hours of work may only be extended with written approval from the Manager of Engineering.

#### **1.5 DESCRIPTION OF THE WORK**

Work under this Contract consists of the installation of approximately 2.7 km of new watermains to replace the existing cast iron water mains for the following five (5) sites:

- Site 1 – Caribou St. W from Fourth Ave. NW to First Ave. NW - 665 m
- Site 2 – High St. W from Eighth Ave. NW to Third Ave. NW - 1058 m
- Site 3 – Third Ave NW from River St. W to Fairford St. W - 244 m
- Site 4 – Keith St. W from Ninth Ave. SW to Valleyview Dr. - 385 m
- Site 5 – Valleyview Dr. from Ninth Ave. SW to Seventh Ave. SW - 351 m
- Replacement of lead service connections and no-corrode sewer connections on those same properties.
- Connection to various existing water mains including all fittings.
- Replacement of CSP storm sewer in intersections.
- Construction of new storm catchbasins and catchbasin manholes where designated.
- Restoration of all disturbed surfaces and an asphalt overlay on all the affected streets.

The Work shall be considered complete when approved by the City of Moose Jaw and all requirements are met.

#### **1.6 COMMUNICATION**

The Contractor will designate a Project Manager/Supervisor, whom, with the Engineer or his designate, will form the primary link for all communications. All instructions, guidance, data and reports will flow between these two persons. The Project Manager will communicate with the Engineer or his designate to discuss progress, clarify instructions and to solve problems as required. It is the responsibility of the Contractor to ensure that a list of contact numbers of all supervisory staff is provided prior to start the work. The Contractor shall keep the Fire Department, Police Department, Transit System and Ambulance Service posted on road and/or hydrant closures.

#### **1.7 SITE INSPECTION**

Bidders are recommended to examine each manhole and its condition prior to submitting a bid. All bidders must comply with the current requirements of the Occupational Health and Safety Act and regulations prior to access of the manholes for site inspections and/or any work under the terms of



this contract.

## **1.8 PRE-CONSTRUCTION MEETING**

Upon award of the Contract, the Engineer will contact the successful bidder to arrange a pre-construction meeting taking place no more than 15 days from Award of Contract.

The pre-construction meeting will be administered by the Engineer and the agenda will include but not limited to:

- Official representatives of participants in the Work;
  - Schedule of Work and construction staging;
  - Schedule of submission of shop drawings;
  - Requirements for temporary facilities, site signs, offices, storage sheds, utility fences;
  - Delivery schedule of specified equipment;
  - Site security;
  - Change orders, procedures, approvals, time extensions, administrative requirements;
  - Force account procedures;
  - Record drawings;
  - Acceptance and warranty period;
  - Monthly progress claims and holdbacks;
  - Quality control, testing agencies and inspection; and
  - Safety issues.

## **1.9 CONSTRUCTION SCHEDULES AND COMPLETION**

At least 10 days prior to commencement of the Work, the Contractor is responsible for preparing and submitting the Construction Schedule for this project in the form of a chart divided into weekly divisions, showing the commencement date and completion of all principal phases of Work. The Engineer reserves the right to schedule construction meetings to review the progress of the Work and the Contractor's schedule. Sequence and correlation of Work, together with an estimated time required for delivery of all materials, shall be provided.

The Contractor shall update the Construction Schedule monthly and a copy will be submitted to the Engineer. If, in the opinion of the Engineer, any Construction Schedule is inadequate as a control tool, or if it does not show the work being completed by the Contract Completion date, the Engineer may reject it until one is acceptable. The Contractor shall execute the Work in such a manner as to complete it on or before November 30, 2017. The successful Bidder shall supply all equipment, labour and materials to ensure that the completion dates are met.

#### **1.10 DOCUMENTS REQUIRED**

Maintain at least one copy at the job site at all times:

- Contract Drawings
- Specifications
- Addenda
- Reviewed Shop Drawings
- Change Orders
- Modifications to Contract
- Field Test Reports
- Copy of approved schedule

#### **1.11 PRIVATE / ADJACENT LANDS**

The Contractor shall not enter on or occupy any private lands without the Owners written consent. Any alterations or damage to private lands shall be restored to original condition or better at the expense of the Contractor. The project limits will be marked out or discussed by the Engineer's representative prior to work beginning. Any damages/ stoppage in work caused by working outside the project limits will be solely at the cost of the Contractor.

#### **1.12 CONSTRUCTION USE OF SITE**

The Contractor shall have full use of the site, provided that the Contractor permits access to the site for purposes of inspections, reviews, tests, and carrying out related work. The Contractor shall return the site in a clean state, free of all materials and construction debris. Protect all trees, plants, fences and other items from damage during construction.

#### **1.13 STAGING / STORAGE**

The Contractor to deliver, store, and maintain packaged material and product with manufactures seals and labels intact at the project site. Staging of equipment and material stock piling, and drying will also be allowed near the City Yards (1100 block High Street West).

#### **1.14 SAFETY PROGRAM**

The Contractor shall be solely responsible for construction safety at the Project Site and in performing the Work, and for the Contractor's compliance, and that of the SubContractors, with all Law and practices relating to health and safety. The Contractor shall be responsible for initiating, maintaining and supervising all safety programs, including the preparation of applicable hazard assessments, in connection with the performance of the Work. Proof of COR Certification in the construction industry must be supplied prior to award of tender. The Contractor shall comply with the Occupational Health and Safety Act, R.S.A, Chapter 0-2, as amended and regulations here under (the "Act"). The Owner may, acting reasonably but at its sole and absolute discretion, for reasons of health and safety, cause parts of, or all of, the Work or Project to be stopped, or the Contractor or any of the SubContractors to be removed or excluded from the Project Site. Such action shall not relieve the Contractor from its obligations under this Contract or otherwise affect the Contract Price, the Contract Time or give rise to any Claim by the Contractor against the Owner.

#### **1.15 POWERED MOBILE EQUIPMENT (PME) TRAINING REQUIREMENTS**

Occupational Health and Safety Legislation requires that only trained and competent operators are required or permitted to operate PME. Training must meet the specific requirements under Table 14.1, and be provided by a competent person(s) and that a written record of all training delivered to workers is kept readily available. Contractors will be required to produce written documentation prior to commencing work that they, and/or their operators, have been trained and are competent within the meaning of Section 154 of the Occupational Health & Safety Regulations.

#### **1.16 PUBLIC PROTECTION & WARNING**

The Contractor shall, as far as practicable, carry out the work causing the least possible obstruction to streets, lanes, or thoroughfares leading to, crossing, adjacent to or alongside of the Work, and shall provide temporary access to locations as directed by the Owner. The Contractor shall not break up or otherwise obstruct any street, lane or thoroughfare without the written approval from Owner or its designate. The Contractor shall provide and maintain all necessary notices, detour signs, barriers, warning lights or other means of protection for the safety of the public from the commencement to the completion of its Work.

The Contractor shall not deposit any material on any street, sidewalk, boulevard or private property without the permission of the Owner or its designate. Any material placed on these locations by the Contractor must be removed as quickly as possible and the boulevard, sidewalk, or other property thoroughly cleaned and restored to its original condition at the Contractor's expense.

The Contractor shall carefully observe any directions given by the Fire Chief with respect to easy access to hydrants that might be in any way be affected by the carrying out of the works. The Contractor shall keep the Fire Department, Police Department, Transit System and Ambulance Service posted on all of his activities which may hinder their access to any street or lane.

#### **1.17 DAMAGE TO PUBLIC OR PRIVATE PROPERTY**

The Contractor must be careful to not damage any adjacent property, public or private, or any infrastructure, and any damage must be restored to its original state by the Contractor at their own expense and to the satisfaction of the Engineer and party concerned. It is recommended that the Contractor discuss items at risk with the City prior to construction as well as mitigation strategies.

#### **1.18 EXISTING UTILITIES AND STRUCTURES**

The Contractor shall be responsible for existing utilities and structures including the following: pipes, culverts, ditches or other items which are part of an existing sewerage, drainage or water system; or which are a part of a gas, electrical, telephone, television, telecommunications or other utility system. Also included are streets, sidewalks, curbs, gutters, swales, poles, fences or any other structure encountered during construction.

The City of Moose Jaw will operate all existing valves. Notification must be given to the Owner and Owner's Engineer 24 hours prior to the requirement to operate any existing valves.

The City has reviewed the site and as-built data. The drawings presented are result of this Work; however, some discrepancies may still exist. The Contractor shall be responsible for all costs associated with locating utilities, establishing locations and must state the use of all existing utilities that may affect the Work.

The "Issued for Tender" drawings, located in Appendix A, note schematic location of utilities only.

#### **1.19 TESTING**

The Contractor shall provide all documentation relating to testing of equipment and supplier's certifications of satisfactory installation. Each system shall be thoroughly inspected to ensure compliance with both the Contract Documents and the reviewed drawings to check for manufacturer's and/or installation defects. The Engineer will witness and verify all tests.

The new pipe can only be put into service when all the testing requirements have been met.

Independent Testing Agencies will be engaged by Owner for purpose of inspecting and testing portions of the Work. Cost of such services will be borne by Owner.

## **1.20 CONTROL OF SUBSURFACE WATER**

The Contractor is responsible for the control and diversion of all water, including but not limited to surface precipitation, snow, rain, ground water, leaking infrastructure, etc. The Contractor shall include the cost of control of all water control in the bid form items. No separate payment will be made for this item.

## **1.21 SURVEYING**

The Engineer will supply an initial construction layout that will include the location of proposed hydrants, valves and water mains. The offset line for the water mains will be supplied in 20 m stationing. The Contractor shall provide the Engineer with a minimum 48-hours' notice prior to any required survey.

The Contractor is responsible to maintain these points and transfer line, and grade. The Contractor must also notify the City prior to backfilling connections, tees, and joints.

## **1.22 FIRE PROTECTION**

The Contractor shall ensure that no more than three (3) hydrants are offline at one time in areas where valves permit hydrant isolation. The Contractor must notify the Engineer of offline hydrants.

## **1.23 ON-SITE SANITARY FACILITIES**

The Contractor shall provide on the site, self-contained chemical toilets for use by the Contractor's staff and civic personnel. There will be no separate measurement or payment for this provision as it will be considered incidental to the Work. It shall maintain in a sanitary condition at all times in accordance with local health authorities.

## **1.24 NOTIFICATIONS**

The Contractor shall provide written notice, approved by the Engineer, to all adjacent property Owners 72 hours before construction commences. This notice shall include information on access, project schedule, water and sewer service interruption details, parking restrictions and Contractor Superintendent's name and phone number (including 24 hour emergency numbers).

## **1.25 DUST CONTROL**

Perform the Work in a manner that will not produce an objectionable amount of dust as determined by the City. There will be no measurement and payment item for dust control measures as this is considered incidental to the Contract.

**1.26 CONSTRUCTION COMPLETION AND FINAL INSPECTION**

Upon written request by the Contractor, the City's Representative will inspect all aspects of the final product within two (2) weeks and provide a list of all deficiencies within one (1) week of inspection.

A representative of the Contractor must sign the inspection report.

In preparation for Certificate of Completion or Total Performance of the project, perform final cleaning. Remove waste products and debris other than that caused by Owner or other Contractors. Inspect finishes, fitments and equipment and ensure specified workmanship and operation. Inspect valve boxes, manholes and hydrants to check for debris and proper operation. Operate valves including those existing prior to construction, to ensure that no damage has occurred or debris accumulated, due to cleanup activities.

**1.27 CLEAN UP**

The Contractor shall clean up the site as the work progresses. It is Contractor's responsibility and there will be no measurement and payment for clean up as this is considered incidental to the contract.

**1.28 FAILURE TO COMPLETE ON TIME**

If the Contractor fails to complete the Work within the Contract Time, the Owner shall be entitled to deduct from any payments due to the Contractor the additional costs to the Owner of the engineering services incurred as a result of the Contractor's failure to complete on time.

It is agreed by the parties that if the Contractor fails to complete the Work or portions of the Work on or before the milestone dates, stipulated final completion date or within such extensions to these completion dates as may be allowed, damage will be sustained by the Owner. It is further agreed that it would be impractical and extremely difficult to ascertain and determine the actual damage the Owner will sustain by reason of such delay. In recognition of the foregoing, the parties to the Contract agree that the Contractor will pay to the Owner the sum of \$1,000/day as a genuine pre-estimate of damages the Owner will sustain in each and every calendar day the Work remains incomplete ("Liquidated Damages").

The Engineer's certification as to the number of days for which Liquidated Damages to be charged will be final and binding on all parties. Liquidated Damages shall not be applied to Statutory Holidays.

Normal extensions to the completion dates as a result of delays due to weather will be provided, only if the total number of days to weather exceeds 10% of the total calendar days starting from the day when work commences to the completion date.

Delays due to weather are based on when work is stopped for the complete scheduled work day or

when weather hampers work so that the work completed is less the 30% of normal work day.

Changes in the scope of the contract shall only be made by Change Order. Changes to the completion date shall be addressed in the Change Order.

The Owner shall also be entitled to deduct from any payments due to the Contractor the additional costs which have been incurred by the Owner as a result of the Contractor's failure to complete the Work within the time required or failure to meet the specified milestone dates for parts of the Works, which costs may include, but are not limited to, costs paid by the Owner to other Contractors engaged on the project.

The above rights are in addition to any other rights the Owner may have and are in no way exclusive. No bonus will be allowed by the Owner for completion of the Works in less than the Contract Time.

### **1.29 WEATHER DELAY**

The Contractor should anticipate that rain delay will occur based on typical weather experienced and no extension will be given to compensate for rain days (greater than 5 mm precipitation) experienced below the historical average, as determined by the Project Engineer. The historical number of rain days in any given month may be rounded up to the next whole day. Extensions to the project completion date may be granted if the number of rain days in any given month is greater than the historical number of rain days. The precipitation data available at "<http://climate.weatheroffice.gc.ca/>" and can be found under "Climate Normal and Averages".

### **1.30 PROGRESS PAYMENTS**

The Contractor is required to submit monthly progress payments in a format similar to the Tender Form, detailing quantities and cost by location of work within five (5) working days after each month's end. The Contractor shall provide supporting documentation such as weigh tickets (and summaries), change orders and force account sheets to the Engineer covering the Progress Payment reporting period. The Engineer shall review the Contractor's claim, prepare Progress Payment Certificate and estimate percentage of work completed will govern calculation of payment on all Progress Payment Certificates. The Engineer shall inform the Contractor of amendments to the claim by copy of Progress Payment Certificate.

### **1.31 FORCE ACCOUNTS OR EXTRAS**

Any Force Account work shall be authorized prior to beginning work. Any force account items must be approved by the Engineer. The Force Account sheets will be signed by the Engineer and Contractor the day of the work. The Force Account sheet shall indicate the equipment used, name of each worker, starting and finishing time with all unit costs.

Force Accounts with dollar extensions are to be submitted by the Contractor within two (2) weeks of the extra work being completed. Payment will be made on the following progress estimate.

Force Accounts submitted without preapproval will not be accepted for payment. The City's inspector will also state in his daily reports if there were any extras that day.

### **1.32 REMOVAL AND DISPOSAL OF EXISTING STRUCTURES**

Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Engineer and at no cost to Owner. Inspect site with Engineer and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain. Locate and protect utilities. Preserve active utilities traversing site in operating condition. Notify and obtain approval of utility companies before starting demolition.

When removing pipes under existing or future pavement area, excavate at least 300 mm below pipe invert.

No payment will be made for removal and disposal of existing structures. This is considered incidental to the installation of new watermains. Hauling costs and landfill charges are the responsibility of the Contractor.

### **1.33 ASBESTOS CEMENT PIPE REMOVAL**

Asbestos bearing material must be disposed of at the City of Moose Jaw Landfill. An asbestos disposal permit is required and can be obtained from City of Moose Jaw Engineering Office, third floor, City Hall.

A burial fee is applicable to every full load or partial load delivered to the Landfill. Therefore, it may be preferable to deliver only full loads of this material. Double bag or wrap and store the material in compliance with applicable codes or direction of a competent authority in a secure location until there is sufficient volume to make a full load.

After loading, tarp or otherwise cover the asbestos bearing material according to applicable regulations before hauling. Pipe material is required to be double bagged or wrapped for disposal.

Conform with the requirements of all other applicable codes and ordinances for storage, handling and transport of this material.

Bear all Landfill charges applicable to disposal of asbestos bearing material.

Safe working procedures covering all aspects of removal of asbestos material, in particular asbestos cement pipe, shall be submitted as part of Contractor submissions and include, but not be limited to, excavation and exposure of material, handling and removal of pipe, storage and transportation,



protective equipment and site control. Procedures shall be in compliance with applicable regulations, and are the sole responsibility of the Contractor.

## **2.0 POTABLE WATER MAIN INSTALLATION**

### **2.1 GENERAL**

Prevent dirt or other foreign material from entering installed pipe with temporary blocking. Install pipe true to line and grade as staked by the Engineer to within 100 mm horizontally and 50 mm vertically. Keep contamination protection cover on pipe ends until just prior to joining to the previously installed pipe. Handle, install and joint pipe in accordance with the manufacturer's instructions. Install pipe such that the spigot ends are inserted into belle ends. Modify pipe ends to be installed into push-on fittings as recommended by the pipe manufacturer. Clean pipe ends of all foreign materials and substances prior to joint makeup. Remove any pipe, which has floated due to trench flooding and reinstall only after acceptable trench and bedding conditions have been re-established. Provide any pipe or joint deflections required in a manner recommended by the pipe manufacturer and/or as approved by the Engineer. Install, bed and backfill pipe such that deflection of pipe is within the manufacturers' tolerances for long term service. Protect pipe and fittings from excessive exposure to direct sunlight or other damage. Replace any pipe or fittings which have become discoloured, cracked or otherwise marred or damaged. Ensure proper operation of all fittings and appurtenances having moving parts both prior to and after installation. Minimum depth of cover on watermains is 2.7 m to top of pipe.

### **2.2 TEMPORARY WATER SETUP AND INSTALLATION**

The Contractor shall have use of City water for temporary water setup free of charge. The Contractor is responsible for making the necessary arrangements for the uninterrupted water supply to all residents affected by water main construction. The City will perform all chlorination and bacteriological testing of the temporary bypass system. The Contractor will be responsible for assisting the City staff in obtaining water samples for testing at locations specified by the City.

The Contractor shall supply, install, and chlorinate a temporary system for continuous pressurized water service to each property affected during construction. This temporary system shall be supplied from the nearest approved fire hydrant using 50 mm potable water supply lines and a minimum of a 12.5 mm diameter supply line connected to each residence or building. The temporary water main system shall be connected to the hydrant with a double check valve assembly. The assembly shall have two (2), independently acting, spring-loaded check valves, and shutoff valves at each end of the assembly with test cocks. Flexible hose jackets shall be abrasion resistant and capable of being driven

over by vehicles without short-term effects. Hose lining shall be of material that does not impart any taste or odour to the water according to NSF/ANSI 61. Hose shall come complete with aluminium couplings and threads.

It shall be the Contractor's responsibility to make all arrangements for the installation, operation, and removal of this system at each property. Place supply lines parallel to each side of the street and as close as possible to the premises being serviced. When a street must be crossed with temporary water supply piping either place the water main in a shallow trench, saw cut into the asphalt, and lay pipe in the cored hole, or lay pipe on the surface of the pavement. Pipe installed on the road surface is to be protected from vehicular and pedestrian traffic with suitable ramps, and provided with suitable traffic warning acceptable to the Engineer. Cuts in pavement may be made only with permission of the Engineer.

Adjacent blocks affected by water disruptions of less than eight (8) hours will not require temporary services. The Contractor shall notify all affected residents 72 hours prior to the water outage in writing, to allow the residents to draw water before the water outage. All such correspondence to the public shall be submitted to the Engineer for approval prior to distribution.

There will be no measurement or payment for the temporary water main setup. The Contractor shall include all costs associated with this setup within water main construction or any other tender item.

### **2.3 POLYVINYL CHLORIDE (PVC) PIPE**

The water distribution lines 300 mm and smaller shall be AWWA C900 CL150 PVC, DR18. Water distribution lines 400 mm shall be AWWA C905 DR18. The pipe bedding shall be as per Section 2.9.1 Bedding Material. Backfill in the pipe zone shall be as per Section 2.10.1 Granular backfill, and backfill above the pipe zone shall be with insitu material, or Class B and the backfill shall be in situ material as per 2.10.2 Backfill above the Pipe Zone.

Gaskets shall be standard gaskets recommended for typical watermain applications where cast iron sized pipe is being used. Nitrile gaskets shall be used for watermain buried in soil with hydrocarbon contamination.

Push-On joint gasket lubricant acceptable to the pipe manufacturer shall be non-toxic, water soluble and approved for use in contact with potable water by the National Sanitation Foundation (NSF).

Approved pipe manufacturers are:

- IPEX
- Royal Pipe Systems
- Rehau
- Approved Alternate

PVC double bell end pipe certified to CSA B137.3 and conforming in all respects to AWWA C900 latest edition for Class 150 pipe. Manufacture pipe with integral wall thickened bell ends complete with factory installed gaskets in one continuous process. Modification of normal bell and spigot pipe to double bell pipe is not allowed

Pipe laying lengths to be 3.05 or 6.01 metres.

Bell ends to be machined to ensure right angles with the inside and outside walls of the pipe and uniform contact between adjoining double bell end pipes.

Short lengths of PVC pipe are to act as connection spools for joining double bell end pipe sections. Length of connection spools to be twice the normal insertion length for spigot end of standard bell and spigot pipe. Bevel on both ends of spools to be standard 15 degree chamfer angle. Insertion stop mark to be on the end of each connection spool.

The unit cost for water main installation by trench excavation is per linear metre of pipe installed and shall include all equipment, material and labour to supply and install PVC pipe including loading, unloading, excavation, boulder disposal, pipe removal and disposal including hauling and landfill charges, dewatering, bracing and sheeting, pipe bedding, backfilling, compaction of backfill, temporary water connections, flushing, disinfection, pressure testing, chlorine and bacteriological testing. Payment will not be made for water main construction that is constructed and not pressure tested or chlorinated.

## **2.4 PIPE BURSTING INSTALLATION**

This Work includes the preparation of the potable water main for accepting the bursting tool and new pipe, CCTV inspections, review of existing service records and plans, and installation of a new potable water main by the pipe bursting process. Prior to construction, the Contractor shall expose existing underground utilities, water services, hydrants, valves, and historical repair locations as required. The Contractor is to isolate the host line and maintain service to affected users by an approved method and as detailed in F-28 Temporary Water Setup.

The Contractor is required to submit the following two (2) weeks prior to the scheduled commencement of all work associated with the pipe bursting operation:

- Detailed specifications of proposed pipe bursting methods.
- Complete details about component materials, their properties and installation procedures.
- Drawings of Work site including location, size, and description of excavations required to conduct the rehabilitation. For each rehabilitated pipe segment, indicate the product layout areas during the bursting process.
- Access shaft or pit excavation shoring design stamped by a professional engineer registered

in Saskatchewan.

- Manufacturer's test data and certification that pipe materials meet requirements of this section.

The Contractor shall not change any material, thickness, design values or procedural matters stated or approved in the submittals without the Engineer's prior knowledge and approval. HDPE to conform to Section 2.5 High Density Polyethylene (HDPE). The Contractor shall clean the line of obstructions such as solids, sediments, protruding service connections, or encrustations that will prevent the completion of the pipe bursting process. If cleaning or obstacle removal methods cannot remove an obstruction, a point repair excavation shall be made to uncover and remove or repair the obstruction. Written approval from the Engineer is required prior to undertaking the Work. Make every effort to identify such locations during tender time after reviewing available service records and record plans. No extra payment shall be made for removal of obstructions that in the opinion of the Engineer were adequately identified at tender time.

The location and number of insertion or access pits shall be outlined by the Contractor and submitted in writing for approval by the Engineer prior to commencement of Work. Unless otherwise stipulated, the pits shall be located such that their total number shall be minimized and the length of replacement pipe installed in a single pull is maximized. Locations of damaged pipe shall be used for insertion/access pits if directed by the Engineer. Delineate pits using traffic cones, barricades, construction taping, flagging, or by some combination of these. Place warning signs to indicate open excavation.

As the bursting head is advanced through the host pipe, the product pipe shall be advanced directly behind the tool to fill the void left by the shattered water main. The installation of the replacement pipe shall not damage other underground utilities in the vicinity of the operation. The Contractor shall be responsible for repairs on surrounding buried infrastructure due to damage caused by the bursting operation. The installed replacement pipe shall be continuous over the entire length. All buried utilities adjacent to the pipe bursting operation shall be reviewed and where necessary be excavated to relieve transient loading during the bursting operation. Pullback and product installation should be completed without interruption, to reduce the risk of the product from becoming stuck in the borehole. During pullback the product pipe must be sealed on both ends with a cap or lug to prevent water and other foreign materials from entering the pipe.

Sections of HDPE replacement pipe shall be assembled and joined on the job site above the ground. Jointing shall be accomplished by the heating and butt-fusion method in strict conformance with the manufacturer's printed instructions. Joint: to AWWA C207. The butt-fusion method for pipe joining shall be carried out in the field by operators with prior experience in fusing polyethylene pipe with

similar equipment using proper jigs and tools per standard procedures outlined by the pipe manufacturer. These joints shall have a smooth, uniform double rolled back bead made while supply the proper melt, pressure and alignment. It shall be the sole responsibility of the Contractor to provide an acceptable but-fusion joint. All joints shall be made available for inspection by the Engineer before insertion. All pipe should be fused into one (1) continuous string prior to the commencement of the bursting process.

The unit cost for water main installation by pipe bursting method is per linear metre of pipe installed, and shall include all equipment, material and labour to supply and install HDPE pipe including loading, unloading, excavation of bore pits, boulder disposal, dewatering, bracing and sheeting, pipe installation, fusing, flange assembly, backfill of bore pits, temporary water connections, flushing, disinfection, pressure testing, chlorine and bacteriological testing. Payment will not be made for water main construction that is constructed and not pressure tested or chlorinated.

## **2.5 HIGH DENSITY POLYETHYLENE (HDPE) PIPE**

HDPE shall be allowed for use as water pressure pipe for pipe bursting installation. All material used shall be new and approved by NSF International.

Polyethylene Compound shall meet ASTM D3350 and shall meet the classification and property requirements in Table 2 of ASTM D3350, and shall have PPI TR-4 HDB listings at 73°F (23°C) of 1600 psi, HDS listing at 73°F (23°C) of 1000 psi and HDB listings at 140°F (60°C) of 1000 psi.

The raw material shall contain 2-3% carbon black, well dispersed in accordance with ASTM F714.

The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material supplier.

The minimum cell classification shall be PE 445474C for PE 4710 materials per ASTM D3350/F714. Dimension ratio (DR) of all HDPE water mains shall be DR 11.

Whenever possible the polyethylene pipe should be joined by the method of thermal butt-fusion, as outlined in ASTM-F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings. Butt-fusion joining of pipe and fittings shall be performed in accordance with the procedures recommended by the manufacturer. The temperature of the heater plate should not exceed  $218^{\circ}\text{C} \pm 14^{\circ}\text{C}$  ( $425^{\circ}\text{F} \pm 25^{\circ}\text{F}$ ) and the joining pressure should not exceed the butt fusion machine manufacturer's instructions.

The polyethylene pipe may be adapted to fittings or other systems by means of an assembly consisting of a polyethylene stub-end, butt-fused to the pipe, a backup flange of ductile iron, made to Class 350, ANSI B16.5 dimensional standards with exceptions, bolts of compatible material and a gasket of suitable red rubber or asbestos-rubber compound cut to fit the joint. In all cases, the bolts shall be

drawn up evenly and in line.

Polyethylene pipes of the same outside diameter, but different wall thicknesses, shall be joined by means of a flange assembly as designated above.

The pipe supplier shall be consulted to obtain machinery and expertise for the joining by butt-fusion of polyethylene pipe and fittings. No pipe or fittings shall be joined by fusion by any Contractor unless he is adequately trained and qualified in the techniques involved.

Pipe manufacturer's representative must provide on-site training and certification for each fusing technician completing pipe joints on the fusing machine used for the work including butt-fusion and electro-fusion. Engineer to be present for all certifications.

The following shall be indent printed on the pipe not exceeding five (5) feet:

- Name and/or trademark of the pipe manufacturer.
- Nominal pipe size.
- Dimension Ratio.
- The letters PE followed by polyethylene grade in accordance with ASTM D1248 followed by the hydrostatic design basis in 160's of psi.
- Manufacturer standard reference.
- A production code from which the date and place of manufacture can be determined.
- Colour Identification, either stripped by co-extruding longitudinal identifiable markings or shall be solid in colour (Blue is Potable water, Green is Sanitary Sewer, Lavender is IQ cover all).

The manufacturer shall provide certification that stress regression testing has been performed. This stress regression testing shall have been done in accordance with ASTM D2837 (Hydrostatic Design Basis) and the manufacturer shall provide a product supplying a minimum HDB and make sure psi meets Standard. The manufacturer shall provide warranty against defects of material and workmanship for a period of 10 years after the final acceptance of the Work by the City.

## **2.6 VALVES**

375 mm and smaller gate valves inclusive to be iron body, resilient seated with materials, manufacturing and performance in full compliance with the latest edition of AWWA C515.

End connections and operators to be fully compatible with the service, location of installation and pipe to which the valve is being attached. Direct buried valves to have a non-rising stem with a 50 mm sq. (AWWA standard wrench nut and open with a counter clockwise rotation) and stainless steel bolting, and exterior asphaltic or fusion bonded epoxy coating suitable for direct bury service. All bronze or brass components to conform to AWWA C515 latest edition.

Approved Manufactures:

- Mueller
- Clow
- As approved

Install valves in accordance with drawings. Use slings manufactured of nylon or other suitable material for hoisting valves in and out of trench excavations. Provide a valve box on each valve that is direct buried. Install PVC bottom section to within a maximum of 150 mm finished grade. There shall be a minimum of 150 mm overlap between the top and bottom sections of the valve boxes. Install thrust blocks or mechanical thrust restraints at all valves.

Where valve boxes are being rebuilt, constructed, raised or lowered, and/or adjusted in conjunction with surface construction or renewal, adjust valve boxes in accordance with the drawings. Adjust top section of valve box by excavating to below collar on bottom section of valve box and raising top section to finished grade. Minimum overlap between top and bottom sections shall be 150 mm. If adjustment required is less than 75 mm then “lifter rings” may be used (maximum of one (1)). Place and compact granular material under collar of valve box to grade required. Use top extension piece where top section of valve box cannot be raised.

Puddle flanges shall use a minimum 6.35 mm steel plate with the diameter as follows:

<b>Pipe Diameter</b>	<b>Puddle Flange Diameter</b>
75 - 300 mm	Pipe diameter plus 50 mm
350 - 550 mm	Pipe diameter plus 100 mm

Measurement shall be made on a complete unit installed and tested. Payment shall be made on the unit price bid per complete unit installed. The payment includes the supply of all labour, material and equipment for the installation of isolation valves including epoxy coating, cathodic protection, testing, installation of the valve, valve box, spindle and casing, anchoring of valves, operating rod, fittings, and all incidental work and items to complete the work for which payment is not specified elsewhere.

**2.7 FITTINGS**

Cast Iron or Ductile Iron fittings for PVC shall conform to the latest edition of AWWA/ANSI C110 and complete with integral tie rod lugs. Push-on joint fully compatible with the pipe being joined and having a working pressure rating of 1.74 MPa (megapascals) or 250 psi (pounds per square inch).

Fittings for pipe less than 400 mm shall be PVC conforming to CSA B137.2 latest revision including injection-moulded tee’s and bends. It shall be in full compliance with AWWA C907 latest revision for a working pressure of 1500 kPa (220 psi). These fittings shall be manufactured by IPEX Inc. or

Harrington Corporation (HARCO) or approved equal.

Fittings for HDPE pipe shall be moulded and manufactured in accordance with ASTM D2683 for socket type, or ASTM D3261 for butt fusion type, and all in accordance with ANSI/AWWA C906 latest edition. Backing Flanges to be ductile iron epoxy coated or minimum grade 304 passivated stainless steel.

Fittings for HDPE pipe shall be fully pressure rated by the manufacturer to match the pipe SDR pressure rating to which they are made. The manufacturer shall provide all accessories required to perform the Work. All fittings shall be installed using butt-fused fittings, thermos-fused fittings/couplings, or flanged adapters. All HDPE pipe and fittings shall be from a single, experienced and qualified manufacturer.

Corrosion Protection required for all Cast Iron and Steel fittings (400 mm and above) shall be:

- Exterior asphaltic coated suitable for direct bury service.
- Interior epoxy lined as per NSF61 to a minimum thickness of 400 microns (16 mils).

The payment for fittings shall include all labour, materials and equipment required for the supply and installation of fittings including supports, thrust blocking, restraints, cathodic protection and all other work incidental to the installation of bends, tees, crosses, couplers and reducers for all types and sizes as indicated on the drawings and in the bid form.

## **2.8 HYDRANTS**

Hydrants shall be designed, manufactured and tested in full compliance with the latest edition of AWWA C502.

Hydrants are to have the following:

- A minimum 114 mm diameter opening lower valve.
- Two (2) - 65 mm x 6 threads per 25 mm hose nozzle.
- One (1) - replaceable bronze pumper nozzle threaded to mate with and securely connect to City of Moose Jaw Fire Department pumper hose connection.
- 150 mm tyton inlet compatible with C900 Class 150 PVC pipes.
- Drain outlet - (6 NPT) shall be on the hydrant.
- Barrel length as required but to provide a minimum of 2.3m bury to top of inlet.
- Breakaway style flange and mainstem.
- Permanently lubricated housing or non-toxic grease oil to be used. Region is mandatory. External means of self-lubrication is necessary instead of dismantling the hydrant.
- Finish on all exterior surfaces below the hydrant flange to be asphaltic coated as recommended by the coating manufacturer and to be coloured in yellow to match the City of



Moose Jaw requirements.

- Manufactures and models:
  - Canada Valve - Century and B-50-B24 Models
  - Mueller - Modern Centurion and Centurion
  - Claw - Brigadier Series M-67
  - Approved alternative

Install hydrants in accordance with drawings. Installation of hydrant must lead straight and plumb, pumper nozzle shall be facing the street, flange is 50 mm above top of curb, walk or finished grade of lot as directed by the Engineer.

All hydrants shall be painted. For ferrous metal surfaces, use PRIMER 302 by United Coatings. Apply two (2) coats of high gloss acrylic polyurethane coating for a finishing touch. The caps will be colour coded based on the main diameter that they are connected to.

In the event a hydrant lead crosses a sidewalk, curb or private property, the Contractor shall install the appurtenance using trenchless methods. If the trenchless method is not possible, the Engineer, on an individual basis, will give permission for any other method. The Contractor shall maintain correct line and grade throughout the tunneled or augured section. The size of the auger shall be the outside diameter of the pipe joint plus 50 mm. The Contractor shall provide an end cap or plug during installation of the pipe into the tunneled section. Any concrete or sidewalk panel removed for construction ease will be restored at Contractor's expense.

Measurement shall be made on a complete unit installed and tested. Payment shall be made on the unit price bid per complete unit installed. The payment includes the supply of all labour, material and equipment for the installation of hydrants including removal and disposal of existing hydrants as indicated on the drawings.

The Work includes excavation, auguring, cleaning, flushing, testing, and disinfecting of pressure and leakage testing, installation of new hydrants, thrust blocks, joint restraints, 16 lb anode, tractor wire, junction boxes, and fill material.

## **2.9 TRENCH EXCAVATION**

The Contractor shall provide a means of safe trench. The trench excavation may have vertical sidewalls for its full depth, maintained by bracing and sheeting or sloped walls from a maximum of 1200 mm above the bottom of the trench excavation to the ground surface. The typical permissible trench width will be 3.0 m for a single pipe. Any trenches wider than the permissible width will be at the expense of the Contractor unless approved by the City Engineer prior to excavation. The Contractor shall follow all Saskatchewan Occupational Health and Safety Regulations with regards

to trench excavations based on the actual soil conditions encountered. Excavated and stockpiled materials must be kept a safe distance away from the edge of trench as directed by the Engineer. Keep excavations free of water while Work is in progress. Excavation must not interfere with the bearing capacity of adjacent foundations. Protect open excavations against flooding and damage due to surface run-off. Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw. Dispose of surplus and unsuitable excavated material off site.

There will be no separate measurement or payment for trench excavation. The Contractor shall include all costs associated with trenching such as excavation, caging/shoring, earth stockpiling, trench bottom preparation, separation/ removal and disposal of materials within the potable water main construction or any other tender item.

### 2.9.1 BEDDING MATERIAL

Provide bedding material having the following gradation limits:

SIEVE SIZE	PERCENT PASSING
10 mm	100
5 mm	95-100
630 µm	25-60
80 µm	0-5

Provide granular material having the following gradation limits:

SIEVE SIZE	PERCENT PASSING
25 mm	100
18 mm	87-100
12.5 mm	72-93
5 mm	45-77
2 mm	29-56
900 µm	18-39
400 µm	13-26
160 µm	7-16
80 µm	6-11

Minimum Permeability  $1 \times 10^{-7}$  centimetres/second.

Class “B” Bedding - Provide clean angular rock material for stabilization of trench bottom with the following gradation limits:

SIEVE SIZE	PERCENT PASSING
80 mm	100
50 mm	95-100
25 mm	20-100
20 mm	0-80
10 mm	0-10
5 mm	2

Crushed Rock - Provide material for drainage with the following gradation limits:

SIEVE SIZE	PERCENT PASSING
40 mm	100
25 mm	75-100
20 mm	20-80
10 mm	0-10
5 mm	0-5

\*Do not supply or place any material until a sieve analysis has been submitted to and approved by the Engineer.

Prior to the conclusion of any working day, the Contractor shall ensure that the trench is backfilled to surface to within 40 metres of the leading edge of the pipe installed that day. The Contractor will not be permitted to install any new pipe on subsequent working days until the backfill is within this limit.

## 2.10 BACKFILL MATERIAL

The Contractor shall import backfill material when suitable excavated material is not available and will backfill and compact it followed by gravel to the street level (if road is not restored within seven (7) days after backfilling) otherwise to sub-grade level (if road is to be within seven (7) days. No extra payment will be made for the supply and handling of imported backfill material and later removal of extra material for sub-grade, base and sub-base preparation.

### 2.10.1 BACKFILL IN THE PIPE ZONE

Backfill with granular material placed in uniform layers not exceeding 150 mm compacted thickness and compact to completely fill spaces under and adjacent to the pipe. Place bedding material to lines and depths required. Provide bell and coupling holes along the trench

bottom so that the pipe barrel is evenly supported throughout the entire length. Mechanically compact to each lift to a minimum of 98% Standard Proctor Density. Mechanical or pneumatic compaction equipment shall be used to compact granular bedding around and up to the spring line of the pipe and for compacting select backfill to 300 mm above the pipe.

#### **2.10.2 BACKFILL ABOVE THE PIPE ZONE**

Backfill uniform layers shall be 150 mm unless otherwise approved by an Engineer. Compact backfill to a minimum of 98% Standard Proctor Density. Control moisture content of the in situ backfill material within  $\pm 3\%$ . Haul and dispose of all material that is unsuitable for use. If material is saturated due to ground water but would otherwise be suitable as backfill, material can be hauled to staging area to be dried and incorporated after acceptable moisture levels are achieved. Import and place acceptable material. Place low shrink backfill such that the material flows into the excavations and fills the entire space. Initial depth of material may not exceed one (1) metre.

#### **2.10.3 BACKFILL COMPACTION**

Compact backfill adjacent to or under slabs, footings and pipes to 100% Standard Proctor Density. Use either hand operated tamper or pneumatically powered structure. Place and compact backfill around structures as to keep load distributed evenly around the perimeter. The Engineer reserves the right to, at the discretion of the on-site inspector; request a wheel loading test to verify the tested densities. The tests shall be conducted using a Contractor supplied tandem axle dump truck fully loaded with Class II backfill material. Any deflection of the soil will result in removal, replacement, and re-compaction of the failed area regardless of the tested density numbers at the Contractor's expense.

There will be no direct measurement and payment for backfilling. The Contractor shall include the cost associated with backfilling in unit cost of water main construction or any other tender item.

### **2.11 CONNECTION TO EXISTING WATERMANS**

The Contractor shall locate the existing mains and connect the new mains as shown on the drawings. Where possible the Contractor shall connect to the existing main using the new pipe and rubber gasket, a valve or other fitting. Alternatively, the Contractor shall supply and install a PVC coupler. "Robar" couplings may only be used with approval from the Engineer. Where approved, the Contractor shall supply and install Teflon-coated Robar couplings, special gaskets, a sacrificial anode and tape and paste.

Installation of clean tie-ins must be completed during a short term interruption in water service (8

hours or less). All piping installed between the tie-in and valve is to be swabbed with chlorine.

Payment will be at the unit price bid per connection for each diameter and type of pipe listed and shall include the supply of all labour, material and equipment to make connection to the existing water main. Do not include the price of reducers or couplers as they are a separate pay item.

## **2.12 WATERMAIN INSULATION (PROVISIONAL)**

Where minimum cover cannot be achieved, the Contractor shall provide insulation to at least the equivalent thermal protection as the specified minimum depth of cover. Insulation shall be provided as shown in the drawings.

Measurement of insulation will be made along the centreline of pipe being insulated from edge of insulation to edge of insulation. This price will include all materials, equipment and labour to supply and install the insulation.

## **2.13 UNSTABLE MATERIALS PROVISION (TRENCH BOTTOM)**

The following pay items are to be used upon approval of the Engineer in locations where unstable sub-grade at trench bottom is encountered. These pay items are not to be used to compensate the Contractor for inadequate dewatering measures which result in a soft trench bottom.

### **2.13.1 EXCAVATION TO WASTE**

All excavated material that is not required for backfilling and sub-grade preparation shall be loaded and hauled to the municipal landfill or 1100 block or High Street West. Additionally, any unsuitable material will also be included in this item. All landfill fees will be waived. The Contractor must separate asphalt, and concrete from all other materials and haul those materials to the High Street recycle centre.

Measurement of waste material shall be made by weigh scale tickets. Payment for excavation to waste will be at the contract unit price per tonne and shall include all labour, material and equipment required to excavate, load, haul and dispose of the material except asphalt and concrete.

### **2.13.2 GEOTEXTILE**

The use of geotextile may be required on this project for unstable trench bottom or unstable subgrade in roadway construction. The Contractor shall provide a needle punched fabric with a minimum unit weight of 330 grams/square metre with a grab tension strength greater than 0.9 kN (kiloNewtons) as determined by ASTM test D4632.

Measurement will be based upon lineal metres of trench covered by the geotextile for a 3m trench width. Payment will be full compensation for labour, materials and equipment

required to supply and install material and shall be at the contract unit price per lineal metre as specified on the Bid Form.

**2.13.3 CLASS “B” BEDDING AND UNSTABLE SUBGRADE**

Where approved by the Engineer, the Contractor shall remove unstable material from the bottom of the trench and replace the unsuitable material with class “B” bedding. The unit price tendered per cubic metre for the Class ‘B’ Bedding and Unstable Subgrade shall include excavation of unsuitable material, removal of unsuitable material from the site and the supply, placement and compaction of class “B” bedding to the level of the sub-grade.

The quantity for payment will be determined from the volume of unsuitable material removed by measuring the depth of excavation and trench width before and after excavation.

**2.13.4 CRUSHED ROCK**

Where approved by the Engineer, the Contractor shall remove unstable material from the bottom of the trench and replace the unsuitable material with crushed rock. The crushed rock base shall be covered with a single layer of geotextile fabric before any bedding material is placed.

The unit price for “Crushed Rock” will be paid for on a cubic metre basis of material used. The unit price shall also include the supply and installation of the single layer of geotextile material and all other material, labour and equipment required to remove unstable material, supply and placement of crushed rock.

**2.13.5 UNSHRINKABLE FILL**

Contractor shall supply an un-shrinkable fill mix design to the Engineer for approval 14 days prior to use. Maximum aggregate size shall be 6 mm. The proportions of materials shall be such as to produce a concrete mixture that will meet the following standards:

<b>Strength at 28 days</b>	0.5 MPa ± 0.25 (measured in accordance with CAN3-A23.2-9C)
<b>Slump</b>	175 ± 25 mm (measured in accordance with CAN3-A23.2-5C)

In addition to bid form items where unshrinkable fill is included, the Engineer may approve the use of unshrinkable fill where necessary to stabilize the trench. The tender item “Supply and Install Unshrinkable Fill” will be used for these purposes.

The tender item “Supply and Install Unshrinkable Fill” will be paid on a cubic metre basis of material used. The unit price will include all material, labour and equipment required to supply and install unshrinkable fill.

**2.14 THRUST RESTRAINTS AND BLOCKS**

Provide a Concrete Mix Design prior to the placement of any concrete. Cement to conform to CSA A5, Type 50. Air Entraining admixtures to conform to CSA A26.1. Water reducing admixtures to conform to CSA A222.2. All admixtures, including retarding admixtures, require approval for use and must conform to ASTM494. Minimum concrete design strength to be 20 Mpa at 28 days. Higher design strength concrete may be substituted to obtain shorter curing time.

Provide only cast-in-place concrete thrust blocks, that are sized and located as shown in the drawings, on all push-on and mechanical joint fittings. Cut bearing soil wall to the proper angle for the fitting and ensure an undisturbed soil bearing face. Obtain approval of the Engineer for all thrust block formwork prior to concrete placement. Place a minimum 200 micrometres (0.2 mm) polyethylene sheet between the full contact face of the fitting and the thrust block. Remove all wooden formwork prior to backfilling.

Use mechanical thrust restraints, or poured in place concrete thrust blocks, with cast iron fittings. Use poured in place concrete thrust blocks only with PVC plugs and end caps. Restrain all joints that fall within the lengths of horizontal and vertical pipes as shown in the drawings. The Engineer may approve an open cut where the Contractor proves that tunnelling or auguring is not possible. Thrust Restraints and Blocks shall be applied around all bends conforming to Section 2.7 Fittings.

Concrete thrust blocks or thrust restraints are not required on 5 degree bends.

There will be no separate measurement for payment item included for thrust restraints and blocks. The cost of these items is to be included in the price of fittings, valves, and hydrants.

**2.15 PETROLATUM PRIMER AND TAPE**

Petrolatum primer and cold applied petrolatum tape shall conform to AWWA C217 latest edition (Cold-Applied Petrolatum Tape and Petrolatum Wax and Fittings for Steel Water Pipeline).

Manufactures and models for Primer and Tapes:

<b>Primer</b>	<b>Tape</b>
Denso Paste	Densol
Polyken 927	Polyken 932
Trenton	Trenton Tec-Tape
PetroWrap Primer	PetroWrap LT
Or as approved	

**2.16 WATER MAIN TESTING**

Supply all necessary labour, materials and equipment for the tests. Provide evidence that pressure gauges used for water main tests have been calibrated within current calendar year prior to undertaking the tests.

Complete water main leakage test upon completion of the installation of service connections. Notify the Engineer at least 24 hours in advance of all proposed tests. Perform tests in the presence of the Engineer. Prior to pressure testing ensure that thrust blocks attain a minimum 15 MPa compressive strength. Ensure that all air is purged from the water main before performing leakage or pressure tests on the system. If the leakage exceeds the allowable limits, locate and repair leaks and defects, repeat the test after repairs until the leakage does not exceed the allowable limits. Visible leaks must be repaired even when the leakage is below the allowable limits. Warranty obligations of the Contractor remain fully in effect in either event.

**2.17 LEAKAGE TEST FOR PVC PIPE**

After backfilling is completed, carry out leakage test of all PVC water mains. At the end of one (1) hour, re-pressurize the main to 692 kPa (100 psi) with water pumped from a tank. Measure the amount of water used to re-pressurize the main to the initial test pressure to determine the leakage in the test section.

For PVC Pipe,

$$L = \frac{ND\sqrt{P}}{130,400}$$

$L$  = the allowable leakage (litres per hour)

$N$  = number of joints in the pipeline tested

$D$  = nominal diameter of the pipe (mm)

$P$  = the average test pressure during leakage tests in (kPa)

**2.18 PRESSURE TESTING IN HDPE PIPE**

Pressure test all HDPE Pipes, couplings, joints and other appurtenances under a hydrostatic pressure in compliance with ABSI/AWWA C906 latest edition. Test pressure shall be 692 kPa. Testing with compressed air is strictly forbidden. Begin test after completion of backfilling and at least seven (7) days after the last concrete bearing pad has been cast. Expose all mechanical joints for visual inspection during testing.

After the initial pressurization of the pipe, add sufficient make-up water at hourly intervals to return the pipe to the original test pressure. Repeat pressurization a maximum of three (3) times after the



original pressurization of the pipe. After three (3) hours the expansion phase shall be completed. Begin the pressure test that shall not exceed eight (8) hours at 692 kPa. If it is not completed in that time, the test shall be permitted to “relax” for another eight (8) hours prior to starting the next test sequence. At the end, re-pressurize the pipe to original test pressure. Measure the amount of water required and it shall not exceed the allowance shown in the following table:

<b>Allowance for Expansion (litres per 30.5 m of pipe @ 23°C) High Density Polyethylene Pipe</b>			
<b>Nominal Pipe Size (mm)</b>	<b>1 Hour Test</b>	<b>2 Hour Test</b>	<b>3 Hour Test</b>
150	1.14	2.27	3.40
125	0.81	1.61	2.46
200	1.89	3.78	5.68
250	2.65	4.92	7.94
300	4.16	8.70	12.87
350	5.30	10.22	15.88
400	10.22	12.49	18.92

## **2.19 CHLORINATION**

The Contractor shall submit a chlorination plan for the Engineer’s approval at the pre-construction meeting conforming to AWWA C651. The City shall supply and perform bacteria and turbidity testing. Saskatchewan Environment requires that the pipes are to be flushed prior to chlorination and disposed in an environmentally safe manner to the nearest sanitary system.

Procedural method of disinfection including chlorine concentration calculations and contact times are to be submitted to the City of Moose Jaw representative for acceptance. Super chlorinated water used for disinfection of the system cannot be directed into a storm sewer or open water body. Chlorinated water can be disposed into the sanitary sewer. Prior to initial acceptance of the water system and the system put into service, bacteriological testing in Section 2.20 Bacteriological Sampling shall be carried out on all water mains and acceptable test results achieved. The initial chlorine concentration in the water main shall reach a minimum of 50 ppm and shall not exceed 150 ppm.

The chlorine concentration at the designated sampling locations will be measured and recorded right after chlorination and compared to the levels measured 24 hours later. Before collecting samples for bacteriological tests, two (2) conditions must be fulfilled after the 24 hour waiting period:

- The chlorine residual at every sampling location should not drop by more than 30% of their

respective initial readings or 25ppm whichever is greater

- Turbidity must be under 1.00 NTU

After chlorinating, the Contractor will flush the water main. Flushing should continue until chlorine residuals and turbidity levels are similar to City water directly upstream of the new water main.

The temporary water lines will require chlorination and flushing prior to use. Temporary water lines or water mains will remain out of service until the City deems the potable water safe. The Contractor shall supply all chlorine compounds, piping, pumps, labour and any other items required for proper disinfection.

All of the Contractor's work to energize, disinfect and flush the water mains shall be carried out under the supervision of the City of Moose Jaw. The City shall coordinate the activities of the Contractor and the Public Works Section during the work required to energize, disinfect and flush the water mains. The Contractor shall not operate any valves of the existing City system unless the approval of the City Engineer has been given.

The Contractor shall include the cost for chlorination in the contract unit prices for Potable Water Main Installation. No separate payment will be made for this Work.

## **2.20 BACTERIOLOGICAL SAMPLING**

As stipulated by Saskatchewan Ministry of Environment, a minimum of two (2) sets of three (3) bacteriological samples must be taken from the water main for each project site shown in the Drawings as well as for all temporary water lines and submitted to the Provincial Water Laboratory. Each set of samples must be taken and submitted 24 hours apart. Samples are to be collected from different points. Water main may not be put into service until found acceptable. If an unacceptable test result occurs, then repeat of disinfection, flushing and sampling procedures is required.

During the bacteriological sampling period, the Contractor shall not remove any water from the water main being tested. Each sampling location must comply with Section 2.19 Chlorination before a bacteriological sample will be collected. Aesthetic parameters will be similar to the source water (colour, taste and odour similar to the City's water supply). If one (1) sampling location does not meet the above standards, none of the bacteriological samples will be submitted to the laboratory.

If any of the bacteriological samples exceed Saskatchewan Water Security Agency (WSA) defined bacteriological standards, the Contractor shall take whatever steps are necessary to correct the problem, at its own expense, until satisfactory test results are received.

If the disinfection failed to produce satisfactory results twice, the Contractor will be responsible for the costs of the increased water use, laboratory tests and any associated business loss or damages claims arising from the delay.

The Contractor shall include the cost for bacteriological testing in the contract unit prices for Potable Water Main Installation. No separate payment will be made for this Work.

### **3.0 SERVICE CONNECTIONS**

#### **3.1 EXTENTS OF SERVICE CONNECTION REPLACEMENT**

Work defined within the scope of this contract extends up to the property line dividing the City's road right of way and private property. However, the City's intent is to facilitate private side removal and rehabilitation as best practice. The Contractor shall understand and agree:

1. It is not part of the City's intent within the scope of this Contract to replace infrastructure on private property.
2. The City will provide homeowner's communication and information regarding lead service connections and aging service connections with the intent to encourage replacement of private services at the same time, taking advantage of potential cost savings.
3. The Contractor will actively engage homeowner's in providing quotations for work, in good faith and with the goal of reducing overall costs, to replace service lines by open trench or trenchless techniques up to the meter.
4. The City will not form a contractual party to any negotiations and any forthcoming contracted work.
5. The City may provide homeowner's with financing options for the work, but this will form a separate agreement between the City and the homeowner.
6. The Contractor will be responsible for coordinating all such work such that it does not impact the contracted work with the City in the form of undue delays or additional expense.

It is expected that approximately 42 of the 98 service connections that are proposed for replacement will be requested to be replaced to the water metre. The Contractor shall factor this into the Project Schedule. Should a larger number of private connections be replaced the Contractor shall submit a Scope Change to extend the contract schedule.

#### **3.2 RECONNECT EXISTING WATER SERVICE IN TRENCH**

Where water service lines are copper and at least 19 mm diameter, water service connections shall be disconnected and reinstalled within the trench at the time of the installation of the water mains.

No payment will be made for services removed or destroyed to facilitate installation of the water main, unless prior approval has been granted. All water services within the limits of the trench shall

be connected to the new water main using new materials.

The tender item Reconnect Water Services in Trench shall include all labour, equipment and material required, but not limited to tapping, service saddles, bends, anodes, service pipe and all other fittings required to connect the existing services to the new water main for each size and type of service listed in the Bid Form.

### 3.3 WATER SERVICE CONNECTION REPLACEMENT

Replacement of lead water service connections and water service lines less than 19 mm will be included under this contract. The City requires the complete removal of these services to the property line including replacement of the curb stop. Lead service lines shall be replaced with equivalent diameter pipe to a minimum of 19 mm.

The Contractor shall notify the City 72 hours prior to any service interruptions. All piping for water services shall be in accordance with the following table and be CSA certified:

Service Size (mm)	Material	Standard	Minimum Rating
All sizes 50 and smaller	Copper-Type K-Soft Drawn	CSA HC66 AWWA C800	1100 kPa (160 psi)
40,50	HDPE	AWWA C901 PE3408	1100 kPa (160 psi)

The Contractor shall supply all material including, but not limited to, main stop, unions, service saddles, anodes, and service pipe. The Contractor is responsible for all tapping. Tapping of the new water main shall be done using a Mueller tapping machine, or approved equal, and done to manufacturers' specifications. Service connections to the main shall be made by direct hot-tapping method.

Payment for water connection replacement will be at the unit rate per lineal metre in the bid form for each type of pipe to be replaced and shall include all labour, materials, and equipment to perform the removal of the lead line and the installation of the new water line including excavation, dewatering, bracing and sheeting, pipe bedding, backfill within the pipe zone, trench backfill, main stops, curb stops, tapping, saddles, service pipe, couplers, reducers required to connect to existing service pipes, leakage testing, pressure testing, disinfection, flushing and all work incidental thereto.

#### 3.3.1 CURB STOPS AND BOXES

For 50 mm and smaller the body must be bronze or brass, stop and waste design, globe or ball valve style, with compression type end connections designed for the specific pipe type(s) being joined. Mueller B25209, Mueller Type H 15219, Mueller Type H15182, Ford Model B44, or as approved. The curb boxes and top extensions shall be Sch. 40 Type 304 stainless

steel pipe complete with polymer boot. The Curb box covers shall be Mueller Type A808 ribbed cover complete with standard pentagon plug No. 143469 or as approved. The Curb box rods shall be Type 304L stainless steel, 13 mm diameter with standard pigtail to fit standard 25 mm I.D curb box. The cold forge u-shape shall be complete with hole for brass cotter pin to fit 20 mm to 50 mm curb stops.

For 100 mm and larger the curb stop shall have a resilient gate valve complete with valve box as specified in Section 2.6 Valve Installation.

Tapping sleeves shall have split body, full circle type with body, stub and flange constructed of fully passivated T304 stainless steel with BUNA-N ring seal and BUNA-S liner. Sleeve bolts and nuts shall be stainless steel conforming to ASTM A193/A194-B8 or B8M. Threads shall be Teflon coated. Outlet flange shall be 150 lb ANSI, flat-faced. Manufactures and models to be ROBAR Series 6066, ROMAC SST or as approved.

Water mains shall be tapped using a Mueller Model B-100, Model B-101, Model A3, Ford Model 77 or as approved. For tapping Asbestos Cement pipe the size shall be at least two (2) nominal pipe sizes smaller than the water main being connected to. For tapping Cast Iron and Steel pipe it will be directed by the Engineer. For tapping PVC pipe, it shall be at least one (1) nominal pipe size smaller than the water main being connect to.

Payment for curb stops will be at the unit price each in the Bid Form. This price to include all labour material and equipment required to supply and install the curb stops.

### **3.4 NO CORRODE SERVICE CONNECTION REPLACEMENT**

Replacement of all no corrode sewer service connections will be included under this contract. The City requires the complete removal of these services to the property line.

Sanitary service pipe shall be minimum 150 mm nominal diameter with Polyvinyl Chloride Pipe to ASTM D3034 - SDR35 and in full compliance with CSA B182.2. Whenever sewer service pipe is installed but not connected to the sewer service from the building, plug the pipe with an approved watertight plug.

Payment for sewer service connection replacement will be at the unit rate per lineal metre in the bid form for each type of pipe to be replaced and shall include all labour, materials, and equipment to replace the sewer service connection including excavation, dewatering, bracing and sheeting, pipe bedding, backfill within the pipe zone, trench backfill, tapping, saddles, service pipe, couplers, reducers required to connect to existing service pipes, and all work incidental to the reconnection.

#### **4.0 ROADWORK**

##### **4.1 ASPHALT SAW CUTTING**

In areas where new asphalt joins existing asphalt, the existing material shall have a straight edge to tie-into. All asphalt and concrete surfaces shall be saw cut to produce a clean, sharp edge. The Contractor shall saw cut asphalt and concrete as outlined in the field by the Engineer. The Contractor shall protect the existing surfaces not designated for removal from damage, and provide for suppression of dust generated by removal process.

Payment for saw cutting asphalt or concrete shall be on a unit price per lineal metre as shown on the bid form. All streets are local and assumed to have 60mm asphalt depth. No consideration will be given for variations in asphalt depth.

Measurement will be based on the actual length of saw cut.

This price is to include all material, labour, supervision and equipment to complete the saw cutting as required.

##### **4.2 ASPHALT REMOVAL AND DISPOSAL**

Clean asphalt chunks can be hauled to the City Yards located on the 1100 block of High Street West. There will be no charge for dumping of this material but the piles must be placed as close together as possible and in the designated area.

Payment for removal and disposal of asphalt shall be made at the unit price per square metre shown in the bid form. Measurement will be made horizontally for the width and length of area to be removed. No consideration will be made for variations in thickness. This price to include all material, equipment and labour required for removal and disposal of all asphalt including hauling costs and landfill costs for unsuitable asphalt.

###### **4.2.1 ASPHALT MILLING- CITY RETAINED MILLINGS**

The Contractor shall mill the existing asphalt structure along the concrete gutter face. The depth of mill at the gutter shall be 25mm, tapering to the existing asphalt surface over an 1800 mm width. The Contractor shall haul the millings to the recycling site on the south side of 1100 High Street West.

The Contractor shall use a milling machine equipped with a conveyor belt loading attachment, specifically designed for milling asphalt. The Contractor is responsible to remove any asphalt ridges along gutter faces or other structures where the asphalt-milling machine cannot reach. The Contractor shall include the cost of removing these ridges in the unit prices under this contract. Paving of milled areas will require sufficient preparation of

surface as noted in the applicable Sections for the Work.

Asphalt Milling will be paid on a unit price per tonne basis. Measurement will be made by weigh scale tickets. This price is to include milling, loading and hauling of the millings to City recycling site.

#### **4.3 CONCRETE REMOVAL AND DISPOSAL**

Clean concrete chunks can be hauled to the City Yards located on the 1100 block of High Street West. There will be no charge for dumping of this material but the piles must be placed as close together as possible and in the designated area.

Payment for removal and disposal of concrete shall be made at the unit price per square metre shown in the bid form. Measurement will be made horizontally for the width and length of area to be removed. This area is to include all walk, curb, and gutter and swale to be removed with no consideration for differing types of curb and gutter or variations in thickness. This price to include all material, equipment and labour required for removal and disposal of all concrete including hauling costs and landfill costs for unsuitable concrete.

#### **4.4 SUBGRADE PREPARATION**

The top 150 mm of subgrade shall be compacted to obtain 100% of Standard Proctor Density for the full depth. It should be compacted at optimum water moisture content for maximum density. The completed, compacted, subgrade surface shall not vary more than 15 mm from the design grades.

Payment for subgrade preparation to the specified depth will be at the contract unit price per square metre. The unit price will be full compensation for scarifying, blading, spreading, shaping, trimming, compacting, adding water, drying, repairing subgrade failures before placing subbase and finishing the subgrade to the required grade, cross-section and density.

#### **4.5 BASE AND SUBBASE COURSE**

The compacted thickness of base course will be 150 mm for all road classes. The subbase thickness will vary depending on roadway class. For Local, Collector, and Arterial streets, the subbase shall be placed at a thickness of 150 mm, 250 mm, and 350 mm respectively.

The gradation requirements are in the following table:

SEIVE DESIGNATION	PERCENT PASSING BY WEIGHT	
	Base	Subbase
50 mm		100
25 mm	100	85 - 100
18 mm	87 - 100	85 - 100
12.5 mm	72 - 93	80 - 100
5 mm	45 - 77	50 - 80
2 mm	29 - 56	32 - 52
900 µm	18 - 39	18 - 32
400 µm	13 - 26	15 - 25
160 µm	7 - 16	11 - 21
75 µm	4 - 9	5 - 12
Plasticity Index	0 - 6	0 - 6

The material passing through the 400 µm sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 6. It shall be free from injurious amounts of organic matter or other deleterious material.

The base and subbase course shall consist of properly combined course aggregate, sand, clay and water and to be compacted in lifts no greater than 150 mm.

The subbase shall be compacted until no further settlement is apparent. The subbase shall be free from rutting or deformations prior to placement of base course. A sample of subbase shall be taken every 500 tonnes and at least one per day of subbase placement. Prior to the placement of base course the subbase shall be proof rolled with a loaded tandem truck (GVW 20 tonnes) or equivalent. If rutting or deflection in excess of 15 mm is noted the subbase shall be recompacted and retested.

Provide one (1) density test for each 100 linear metres of compacted base course as directed by the Engineer. Each layer of base course shall be compacted to at least 100% of the maximum Standard Proctor Density. Water shall be applied to the base course to achieve optimum moisture if required. A sample shall be taken of the base every 500 tonnes and at least one per day of base placement. Perform a minimum of one nuclear density test per 250 m<sup>2</sup> per lift. Nuclear method testing for density and moisture content of material compacted in place in accordance with ASTM D1156.

All of the work shall be free of major depressions, scorings, roller marks and irregularities and be properly graded to the levels as shown.

In order to ensure the correct thickness of sub-base and base, the elevation of the sub-grade, sub-base, and base courses, must be checked jointly by the Contractor and the Engineer or its representative.



The Contractor cannot place a new layer until minimum density at grade is met and checked.

Payment for granular base course and subbase course will be at the contract unit price per square metre for each thickness shown in the Bid Form. The unit price will be full compensation for loading, hauling, dumping, spreading, watering, aerating, compacting, and proof-rolling. The unit price will also be full compensation for adding binder and/or filler sand.

#### 4.6 HOT MIX ASPHALT CONCRETE (TYPE MJ2 OR MJ4)

##### 4.6.1 WEATHER REQUIREMENTS

The Contractor shall not place Hot Mixed Asphalt (HMA) during periods of precipitation and shall not place HMA on any surface that has not completely dried. When precipitation is forecasted, the Contractor shall take reasonable steps to minimize the amount of HMA is exposed to precipitation, during the rolling period.

##### 4.6.2 PAVING DETAILS

During the paving operation, it is important to note that any irregularities if encountered must be corrected immediately. The asphalt adjacent to the concrete gutter lip shall be 5 to 10 mm above the lip after final compaction. A vertical joint must be made where the new and old asphalt meet. All vertical joints shall be tack coated. All manholes and valves shall be from 5 to 20 mm below the final asphalt grade, which may require adjustment or risers. These details will be considered a subsidiary obligation of the paving operation, and there will be no direct payment for this Work.

##### 4.6.3 ASPHALTIC MATERIALS

The gradation requirements shall be met upon the following table based on ASTM C136 and C117:

SEIVE DESIGNATION	PERCENT PASSING BY WEIGHT	
	MJ2	MJ4
SIZE		
20 mm	-	-
16 mm	-	-
12.5 mm	100	100
9 mm	79 - 89	98 - 100
5 mm	52 - 62	85 - 95

SEIVE DESIGNATION	PERCENT PASSING BY WEIGHT	
	2 mm	30 - 42
900 µm	13 - 38	32 - 42
400 µm	10 - 26	15 - 26
160 µm	3 - 10	6 - 15
71 µm	2 - 5	3 - 7

The material retained on the 5 mm sieve shall have a minimum of 70% with one crush face for MJ2 and 80% with two (2) crushed faces for MJ4. Additionally, the material passing the 5 mm shall consist of 70% crushed for MJ4.

The maximum permissible variation from the job mixes formula gradation shall be as follows:

Gradation	MJ2	MJ4
5.0 mm	± 4.0	± 3.0
2.0 mm	± 4.0	± 3.0
900 µm	± 3.0	± 3.0
400 µm	± 3.0	± 3.0
160 µm	± 2.0	± 2.0
71 µm	± 1.5	± 1.5

The Marshall Mix designs are to be completed in accordance to the latest edition of the Asphalt Institute Manual Series No. 2 (MS-2) ASTM D1559 and ASSHTO T-245. The Contractor shall provide the engineer with a job mix formula for each asphalt type for approval. The Contractor will only be able to place asphalt that has been approved.

Physical properties on the mixes shall meet the requirements on the following table:

Property	ASTM Test Method	MJ2	MJ4
Asphalt Grade	-	150/200 A	150/200 A
Marshall (blows per face)	-	50	50
Marshall Stability (kN) @ 60 °C min.	D1559	8	8
Retained Stability (%) min.	-	75	75
Marshall Flow Index (mm)	D1559	2 – 4	2 – 4
Air Voids in Mixture (%)	D3203	2 – 4	3 – 5

Property	ASTM Test Method	MJ2	MJ4
Voids Filled with Asphalt (%)	D3203	75 – 85	75 – 85
Min. Film Thickness (µm)	-	8.5	8.0

The stability and flow shall be evaluated using ASTM D1559. The percentage of voids and the percentage of voids filled with asphalt shall be evaluated using ASTM D3293 and C128. The minimum asphalt content shall be 5.7% for MJ2 and 6.5% for MJ4.

#### 4.6.4 ASPHALT OVERLAY

The entire roadway (curb to curb) will be overlaid with 30 mm of HMA where indicated on the drawings. Payment for the asphalt overlay will be at the contract unit price per tonne as shown in the Bid Form. Measurement will be based on actual square metre area of overlay placed. There will be no compensation for asphalt placed in addition to the designated overlay areas as shown on the drawings. The unit price will be full compensation for removing overburden; supplying, excavating, crushing, screening, stockpiling and drying the aggregate; supplying, heating and storing the bituminous binder; supplying, storing and adding additives; hauling, storing, and adding water and mixing, loading, hauling, dumping, spreading, compacting, and finishing the bituminous surface course.

#### 4.6.5 PAVEMENT STRUCTURE

If the Contractor is able to utilize trenchless or other means to reduce the excavated pavement in one (1) section of the project they will be allowed to use that over to offset a section where they executed the maximum widths. No bonus will be paid.

The pavement structure for this contract is as follows:

Site No.	4,5	1	2,3
Asphalt	Type MJ2 HMA one lift - 60 mm	Type MJ2 HMA one lift - 90 mm	Type MJ2 HMA two lifts - 110 mm
Base	150 mm	150 mm	150 mm
Sub-base	250 mm	250 mm	350 mm
Sub grade Prep	150 mm	150 mm	150 mm

Payment for Hot Mix Asphalt will be at the contract unit price per square metre for each asphalt type and thickness shown in the Bid Form. The unit price will be full compensation for removing overburden; supplying, excavating, crushing, screening, stockpiling and drying

the aggregate; supplying, heating and storing the bituminous binder; supplying, storing and adding additives; hauling, storing, and adding water and mixing, loading, hauling, dumping, spreading, compacting, and finishing the bituminous surface course.

#### 4.6.6 PAYMENT ADJUSTMENTS

Quality assurance testing to determine acceptance and possible payment adjustments will be administered by the City based on these specifications. One test will represent a maximum lot size of 300 tonnes. The Contractor is encouraged to complete their own quality control testing.

Type MJ2 shall be compacted to 98% of Marshall and type MJ4 shall be compacted to 95% of Marshall.

The percent compaction of Marshall payment adjustment is summarized in the table below:

<b>TYPE MJ2 % of Marshall</b>	<b>Payment (%)</b>	<b>TYPE MJ4 % of Marshall</b>	<b>Payment (%)</b>
97.6 - 97.9	100.0	93.6 - 94.9	100.0
97.0 - 97.5	98.0	92.6 - 93.5	98.0
96.6 - 96.9	96.0	91.7 - 92.5	80.0
96.0 - 96.5	93.0	91.1 - 91.6	65.0
95.0 - 95.9	90.0	Below 91.0	Reject
94.0 - 94.9	80.0		
92.0 - 93.9	65.0		
91.0 - 91.9	50.0		
Below 91.0	Reject		

When considering payment adjustment for high air voids due to low density, the asphalt cores will be corrected to 100% Marshall Density. This will result in a sample with 5% air at 98% compaction to be considered 3% air and therefore not receive an adjustment for air voids being outside the specification limits. There may however be a density adjustment.

Air void payment adjustment is summarized in the table below:

<b>Excessive Air Over Specifications (%)</b>	<b>Payment (%)</b>	<b>Insufficient Air Under Specifications (%)</b>	<b>Payment (%)</b>
Below + 0.5	100.0	Above - 0.4	100.0

+ 0.5	95.0	- 0.4	95.0
+ 0.6	90.0	- 0.5	87.5
+ 0.7	85.0	- 0.6	80.0
+ 0.8	80.0	- 0.7	72.5
+ 0.9	75.0	- 0.8	65.0
+ 1.0	Reject	- 0.9	57.5
		- 1.0	50.0
		Below – 1.0	Reject

Marshall Stability payment adjustment for MJ2 and MJ4 is summarized in the table below:

<b>Marshall Stability (kN)</b>	<b>Payment (%)</b>	<b>Marshall Stability (kN)</b>	<b>Payment (%)</b>
Above 7.9	100.0	7.0 to 7.2	80.0
7.8 to 7.9	98.0	6.8 to 6.9	65.0
7.6 to 7.7	95.0	6.5 to 6.7	50.0
7.3 to 7.5	90.0	Below 6.5	Reject

Payment for low asphalt content will be reduced by the factor in the table below:

<b>% Asphalt Content Below Specified Limit</b>	<b>MJ2</b>	<b>MJ4</b>
-0.1%	1.0	1.0
-0.2%	1.0	1.0
-0.3%	0.95	0.9
-0.4%	0.8	0.75
-0.5%	0.65	0.5
-0.6%	0.5	Reject
-0.7%	Reject	

Measurement and payment for asphalt paving will be on a tonne basis and will include all materials, labour, and equipment to place and compact the hot mix.

#### **4.6.7 SURFACE / ROAD RESTORATION**

All excavated pavement must be restored with the pavement structure described in Section 4.6.5 Pavement Structure; however, there will only be payment on a maximum restoration of 3.0 m trench width or as shown in the Drawings.

#### **4.6.8 ASPHALT PRIME, TACK AND FLUSH COAT**

The asphaltic material shall meet the current specifications of the Asphalt Institute. Generally, SS-1C emulsified asphalt shall be used for prime, tack or flush coat. The Contractor shall be required to dilute the emulsified asphalt with water, as required.

The asphaltic material shall be applied by means of a self-powered pressure distributor that shall have a capacity of not less than 4,500 litres.

The distributor shall be equipped with the following appliances and devices in proper operating condition:

- Tachometer.
- Pressure gauge.
- Adjustable length spray bar.
- Positive displacement asphalt pump with separate power unit.
- Heating coils and burner capable of supplying even heat to the bituminous material.
- Thermometer well and accurate thermometer

The rear chassis springs shall be blocked or chained if necessary. All spray bar nozzles shall be marked by manufacture type and size. Clogged nozzles shall be removed and cleaned with solvent. All nozzles shall have been set in the spray bar so that the nozzle slots make the same angle (15 to 30) with the longitudinal axis of the spray bar. The spray bar shall be adjusted to the correct height to ensure uniform application without streaking and been provided with a positive shut-off to prevent dribbling. The distributor shall be capable of maintaining a uniform speed and may be checked for calibration by the Engineer before being used on the Work.

The Contractor shall ensure that the surface to be coated is free of standing water and Prime coat is not applied during a period of rain or when rain is imminent. Any loss of coating due to rain or accumulation of wind debris shall be re-coated at the Contractors expense. MC-30 has a temperature limit between 25-60 and SS-1C does not have a limit.

The asphalt material shall be applied in a single application at the rate of 0.75 to 1.50 per square metre specified by the Engineer. After curing, if any excess primer remains on the surface, the Contractor shall apply and approved sand where necessary to blot up the excess

emulsion. The sand cover, where used, shall consist of clean, granular, mineral material approved by the Engineer, all of which shall pass a 5.0 mm (No. 4) sieve. Only sufficient sand shall be spread to blot up excess emulsion and such areas shall be swept to remove excess sand before pavement is laid. No pavement is to be laid until approved by the Engineer.

The Contractor shall maintain the primed surface until the surfacing course has been placed. Any areas of primed surfaces that have become fouled by traffic, or otherwise, shall be cleaned before paving. Weak spots that show up after the surface has been primed shall be repaired. Unless instructed otherwise tack coat will always be required between layers of asphalt material on all roadwork. The Contractor will allow a minimum of two (2) hours for tack coat to cure. If there are instances, where tack coat has not cured after two (2) hours have passed the Contractor shall contact the Engineer for further instruction.

There will be no separate payment for prime, flush, or tack coat and the cost of these shall be included in the asphalt price.

#### 4.7 CAST-IN-PLACE CONCRETE

Do cast-in-place concrete work in accordance with CAN/CSA-A23.1, .2 and .3, except specified otherwise. Provide certification on materials, and equipment. Provide certification and test results showing that mix proportions selected will produce concrete of specified quality, durability, volume stability, yield and strength and will comply with CAN/CSA-A23.2 prior to placing the concrete.

Portland cement conforming to CAN/CSA-A5 type 50 (sulphate resistant for all concrete). For Air Entraining Admixture refer to CAN2 A266.1 and for Chemical Admixtures refer to CAN3 A266.2M.

Non-shrink grout is to be premixed consisting of non-metallic aggregate, Portland cement, water reducing, and plasticizing agents. Reinforcing steel dowels or anchor bolts to be Set 45 as supplied by Master Builders. Supplementary Cementing Materials (CAN/CSA-A23.5M). Bonding Agent to be 100% solids polysulphide epoxy compound. Joint Fillers to conforming to ASTM D1751.

Class B concrete shall be used for all walk, curb, gutter, and swale construction. Concrete shall have the following classes and properties in construction:

Class	Minimum Compressive Strength at 28 days (MPa)	Slump (mm)	Entrained Air Limits (% by Volume)	Maximum Aggregate Size (mm)	Maximum Water/Cement Ratio (By Mass)	Minimum Cement Contents (kg/m <sup>3</sup> )
B	30	75 ± 13	5 - 7	20	0.45	335
Fillcrete	0.3 - 0.6	100 ± 25	4 - 6	-	-	30

Obtain Engineers review before placing concrete and provide 24 hours written notice prior placing of concrete.

#### **4.7.1 CONCRETE, WALK CURB AND GUTTER**

##### **4.7.1.1 SUPPLY AND INSTALLATION OF DOWELS**

The construction of concrete sidewalk ramps and sidewalks adjacent to curbs and cold joints on this project require that 250 mm long - 10M deformed steel dowels be used to connect the two concrete structures. The dowels shall be inserted 100 mm into the adjacent structure and extend 150 mm into the new concrete using a spacing of 600 mm. All drilling into the adjacent concrete curb will be done as part of this Work. Dowels shall be galvanized, epoxy coated or stainless steel. The ends of each dowel shall have the same coating as the rest of the dowel.

There will be no direct payment for the supply and installation of the steel dowels.

##### **4.7.1.2 BACKFILL BEHIND THE CURB AND WALK**

Backfill behind the curb/ walk is an integral component of concrete construction. The Contractor shall utilize select material from the road excavation to backfill behind the curb and walk to an elevation 100 mm below the top of the curb and to a minimum width of 1000 mm beyond the back of the curb and walk. Concrete construction will not be complete until this component is finished. There will be no direct payment for backfill behind the curb and walk.

Measurement and payment shall be at the unit price per square metre for all sidewalk. Measurement and payment shall be at the unit price per linear metre for all curb and gutter. No consideration will be made for differing types of curb and gutter. This price to include supply of all material, equipment and labour to prepare the base, form work, placement of concrete, jointing, reinforcing, finishing, curing, backfilling and clean-up and all other work incidental thereto.

#### **4.7.3 MPA CONCRETE (PROVISIONAL)**

The Engineer may approve the use of 20 MPa concrete where necessary to stabilize the subgrade beneath the roadway. The unit price tendered per cubic metre of 20 MPa concrete will be full compensation for the supply and placing 20 MPa concrete where directed by the Engineer.

The tender item "20 MPa Concrete" will be paid on a cubic metre basis of material used.



The unit price will include all material, labour and equipment required to supply and place 20MPa concrete.

## **5.0 STORM SEWER**

### **5.1 CATCH BASIN LEAD REPLACEMENT**

All catch basin leads shall be connected to storm sewer manholes or other catch basin barrels. The connection of leads directly to the mains will not be permitted. Catch basin leads shall be laid in a straight line at a uniform grade of not less than 2%. Upon excavation of the trench to the required depth, a layer of pipe bedding aggregate shall be placed and compacted to 98% of Standard Density to a minimum depth of 75 mm. There shall be a maximum of two (2) couplers allowed per single catch basin lead.

Catchbasin leads shall be minimum 250 mm diameter PVC Ribbed gravity sewer pipe shall conform to CSA certified B182.4-M90 and shall be Class V pipe of minimum pipe stiffness of 320 kPa and ASTM F794-93a. PVC joints shall be locked-in gasket and integral bell system. Storm sewer pipes connecting a catchbasin to a catchbasin manhole shall be minimum 300 mm diameter.

Payment for catch basin lead replacement will be at the unit price per lineal metre as shown on the bid form. Measurement will be based upon measured length from centre of catchbasin to centre of manhole. This price to include all labour, equipment and materials for excavation, removal and disposal of existing CSP pipe, supply and installation of PVC Ribbed pipe, sand bedding, backfill within the pipe zone, excavation, boulder disposal, dewatering, bracing and sheeting, backfilling, compaction of backfill, connection to catchbasin, grouting, and all work incidental thereto.

### **5.2 PRECAST CATCHBASINS AND CATCHBASIN MANHOLES**

Precast catchbasins and catchbasin manholes are to be constructed to the requirements of ASTM C478 with dimensions shown on the drawings and as designated by the Engineer in the field. Cement shall be Type HS Sulphate Resistant Portland Cement meeting CAN/CSA-A5/A8/A362-M89. Minimum wall thickness shall be 90 mm. All manhole sections shall have single offset or grooved "O" ring rubber gasket joints manufactured in accordance with the provisions of ASTM C443.

Manhole and catch basin bedding must be granular. Refer to Section 2.9 Trench Excavation and 2.10 Backfill Material.

All catchbasins are to have a minimum 900 mm diameter barrel.

#### **5.2.1 REMOVE AND REPLACE EXISTING CATCHBASIN WITH STANDARD 900 mm CATCHBASIN**

Payment for Remove and Replace Existing Catchbasin with Catchbasin Manhole will be

made at the unit price for each Catchbasin Manhole shown in the bid form. This price to include all labour, equipment, materials to remove and dispose of the existing catchbasin, excavation, installation of the base, barrel, reducers, adjustment rings, “O” Ring rubber gaskets, grouting, bedding, granular backfill surrounding barrel, backfilling, compaction, all work incidental thereto.

## **5.2.2 FRAMES AND COVERS**

Frames and covers shall be close-grained grey cast iron meeting ASTM A48, Class 20 or cast steel conforming to ASTM A27, Grade 70-36. Any substitution shall be subject to the approval of the Engineer. All frame and covers shall be true in form and dimension, free from faults, sponginess, cracks, blow holes, and other defects. Bearing surfaces shall be machined to prevent rocking. Frames and covers shall be bitumen coated by dipping. Standard manholes shall be floating manhole frame with vented solid cover. For catchbasins use Norwood Foundry No. F-35 (rolled curb), Norwood No. F-36 (barrier curb), F-51 (Side Inlet) or approved equal. Where existing catch basins do not permit the above frames and covers, then a Norwood No. F-60 or approved equal.

Payment for Catchbasin and Catchbasin Manhole Frames and Covers will be made at the unit price per type of frame and cover shown in the bid form. This price to include all labour, equipment and material required for the supply and installation of each frame and cover.

### **5.2.2.1 RIM ADJUSTMENTS**

An adjustment shall be defined as the addition or removal one (1) or more courses of brickwork or precast riser rings. All tops shall be firmly set into position at the required elevation and grouted. Re-setting of disturbed grouting and change of rim elevations of less than one (1) course of brickwork or less than one (1) riser ring is not considered an adjustment. Adjustments do not include the removal or addition of batter blocks, manhole blocks, or precast riser rings. The Contractor shall bring all manholes and catchbasins to the finished grade elevation designated by the Engineer. The manhole shall show no depressions or bumps exceeding 5 mm under a straight edge 3 m (minimum long, placed parallel to the road centre line. The cost of renovating manholes or catchbasins damaged as a result of the Contractor’s operations shall be borne by the Contractor.

There will be no separate payment for rim adjustments as this work is considered a subsidiary obligation of the paving operation, and there will be no direct payment

for this Work.

## **6.0 MISCELLANEOUS**

### **6.1 LANDSCAPE RESTORATION**

All landscaped areas disturbed by construction as designated in the drawings shall be restored, including disturbance to landscaping on private property arising from curb stop installation.

All topsoil areas shall be restored to pre-construction condition. All topsoil removed for excavation shall be stockpiled and replaced following backfill and compaction. Topsoil stockpile shall be kept separate and shall be kept free of any additional clay lumps, coarse sand and gravel 2 mm larger, and of any other foreign matter.

For sodded areas, keep topsoil 15 mm below finished grade. All sod shall be removed to stockpile and replaced following construction. In areas where sod cannot be preserved as designated in the field by the Contractor and Engineer, existing grass areas shall be reseeded. Grass seed shall be Certified No. 1 Grade in accordance with Government of Canada “Seeds Act” and “Seeds Regulations” and having minimum germination of 85% for irrigated grass seed and minimum purity of 97%. All seed is to be Zone 2B hardy. Seed is to be free of weeds as listed under the Saskatchewan Noxious Weeds Act.

Substitutions are to be approved by the consultant. Supply in writing actual varieties used in the seed mix.

Seed at a rate of 0.9 to 1.3 kg per 100 sq.m (2 to 3 lbs per 1,000 square feet)

- 25% Hard fescue (*Festuca duriscul*) Varieties: Spartan, Aurora
- 25% SeaLink Creeping Red fescue (*Festuca rubra litoralis*)
- 25% Creeping Red fescue (*Festuca rubra*) Varieties: Aberdeen, Jasper 2
- 25% Kentucky bluegrass Varieties: Baroness, Royale, Mallard, Moonlight, Unique, Lily, Langara, Bedazzled

All mulch beds, crushed rock, river rock, and all other unfixed landscape features shall be removed to stockpile during excavation and replaced to their original condition once backfill and compaction is complete. Any underground irrigation systems disturbed by construction shall be restored to their pre-construction condition.

All fixed landscape features such as concrete walks, paving stones, boulders, decks, retaining walls and all other above ground landscape features shall be preserved during construction. Where fixed landscape features cannot be avoided, the Contractor shall remove them and restoration shall be backfill and compaction of trench material to subgrade level. The Contractor will not be responsible for replacing fixed landscaping structures.

Payment for landscape restoration will be made at the unit price per square metre shown in the Bid Form. Measurement will be based on actual area of landscaping restored. This price to include all equipment, material and labour required to restore all landscaped areas to the conditions stated above. Any landscape restoration required outside of the areas shown on the drawings will be the responsibility of the Contractor and no additional payment will be made.

## **6.2 TREE REMOVAL AND DISPOSAL**

All trees and shrubs are to be preserved during construction. If any trees or shrubs must be removed, the Owner must grant approval prior to removal.

For Tender evaluation purposes, the quantity of Tree Removal and Disposal is set at 1 unit. This price is to include all materials, equipment and labour required to remove and dispose of the existing tree including hauling and landfill fees.

## **6.3 MOBILIZATION AND DEMOBILIZATION**

Costs incurred which are fixed costs occurring at the beginning and end of the Contract shall be paid under Mobilization and Demobilization. Included in mobilization are such items as bonding, insurance, permits, moving, personnel, materials and equipment to the site, setting up washroom facilities and all preparation for performing the Work. Included in demobilization are removal of all personnel, materials, equipment, and clean-up of the site and Work. The Contractor shall demobilize his equipment and construction facilities in an orderly and expeditious manner.

60% of the Mobilization and Demobilization amount tendered will be included in the first progress payment certificate. The remaining 40% will be included in the final progress payment certificate.

## **6.4 TRAFFIC ACCOMMODATION**

The Contractor is responsible for public safety within and abutting the project limits. Regulate traffic in accordance with the Manual of Uniform Traffic Control Devices for Canada, current edition, as published by the National Committee on Uniform Traffic Control, and distributed by the Transportation Association of Canada. If the Contractor's equipment will affect active traffic lanes then the Contractor is responsible to provide qualified flag persons. The Contractor will supply and install all signs, signals, overnight fencing and barricades to ensure the safety of the public. The Contractor will be responsible for properly barricading and maintaining the project site. The Contractor shall not close any lanes of road without approval of Engineer. Keep travelled way well graded, free of potholes, and of sufficient width that required number of lanes of traffic may pass. When working on travelled way place equipment in position to present a minimum of interference and hazard to travelling public, keep equipment as close together as working conditions will permit

(preferably on the same side as travelled way), and do not leave equipment on travelled way overnight.

The cost of all signs, detours, detour maintenance, and labour shall be included in the bid price as lump sum items. Progressed payment will be made for each site once the sites are complete.

#### **6.5 SUPPLY OF TEMPORARY WATER OUTSIDE OF ISOLATION ZONE**

Where a watermain adjacent to the isolation zone is depressurized, the affected property owners will receive a boil water advisory until bacteriological tests are returned. This can affect water users for three days or more. In the case where a business relies on their water supply to serve their customers, and a boil water advisory would place that business in non-compliance of health codes, the Contractor shall provide temporary water service to the property. The Contractor shall identify the potential properties adjacent to the isolation zone, and give proper notice to ensure no major disruption of service.

Payment for the supply of temporary water outside of isolation zone will be made at the lump sum price for each property. This price to include all labour equipment and materials required to supply the property with temporary water in accordance with Sections 2.2 Temporary Water Setup and Installation, 2.19 Chlorination, and 2.20 Bacteriological Sampling. This is a provisional bid form item and may not be required.

#### **7.0 APPENDIX “A”**

Drawings

#### **8.0 APPENDIX “B”**

Service Connection Cards

**END OF SPECIFICATIONS**

<b>Date:</b>	April 13, 2017	<b>File:</b>	2015- 4673.010.C.01.00
<b>Time:</b>	2:00 pm (CST)	<b>Page:</b>	1 of 4
<b>Project:</b>	2017 Cast Iron Watermain Replacement Program		
<b>Subject:</b>	Bidder's Briefing		
<b>Client:</b>	City of Moose Jaw		
<b>Location:</b>	AE Regina Office		
<b>Present:</b>	Those Present		
<b>Distribution:</b>	Those Present		

## RECORD OF MEETING

This Record of Meeting is considered to be complete and correct. Please advise the writer within one week of any errors or omissions, otherwise this Record of Meeting will be considered to be an accurate record of the discussions.

### Action by

### Discussion:

#### 1 PROJECT TEAM INTRODUCTIONS

- Mike Binns started the meeting at 2:00 pm
- See Sign in Sheet for attendees

#### 2 PROJECT OVERVIEW

##### 2.1 BACKGROUND

Clark Gates, Associated Engineering, gave a brief overview of the project:

- The City of Moose Jaw (City) has a great deal of cast iron mains which requires replacement. The first phase started last year and the City is planning on replacing approximately 80 km of cast iron water mains over a 20 year period. There are many breaks throughout the City every year and the service to residents is not there. This project is important because there is a great deal of issues stemming from it. The City of Moose Jaw is excited to move forward with this project and Associated Engineering (AE) will be on with them for at least the first two phases of this work. The program this year will not be funded through the LIP program and will be solely funded through the City of Moose Jaw. The 2017 program provides the replacement of cast iron replacements to the residents curb stops. The City is urging the residents to replace the remaining cast iron from the curb stop their water meters as it poses health risks to residents. It will be the Contractor's responsibility to work in good faith with the residents that are wanting to replace their cast iron water main to provide a quote for the replacement. This work will be done solely through the Owner and the successful Contractor. The resident will be given two options for payment, either in full to the Contactor or add the sum to their taxes, 4% over 7 years.

Subject:  
April 13, 2017  
- 2 -

**Action by**

**Discussion:**

**2.2 SCOPE OF WORK**

Clark Gates, Associated Engineering, gave a brief outline of the Scope of Work involved:

- The project consists of three (3) Sites The scope of work includes the installation of approximately 2.7 km of water main ranging in size from 150 mm to 400 mm with associated fittings, valves and hydrants. The project also includes the replacement of non-copper water service lines, no-corrode sewer service lines, corrugated steel pipe storm lines and roadway restoration as outlined in the Contract Documents.

**3 REVIEW OF QUESTIONS RECEIVED**

Clark reviewed the questions received to date, and their responses, and went over them at length (see Addendum No. 3). The following questions/comments arose during this time:

- What is the difference between the City of Moose Jaw and City of Regina Service Box?

Answer: The City of Regina requires stainless steel curb boxes, stems and extensions; other specifications allow for cast-iron.

- What is the practice of temporary water supply?

Refer to section 2.2 Temporary Water Setup and Installation. The Contractor is required to abide by the specifications and schedule their work accordingly. The City would prefer if affected properties be on temporary for as short of time as possible.

- How are properties (especially restaurants) being dealt with where they are outside the work zone, but the watermain they are connected to is temporarily depressurized resulting in a boil-water advisory?

A provisional item has been added to the Bid Form – Item 1.7.4 Supply of Temporary Water Outside of Isolation Zone. Refer to Specification 6.5 Supply of Temporary Water Outside of Isolation Zone included in this addendum.

- Non functional hydrants and valves – Is the City operating prior to construction?

The City will operate all hydrants and valves prior to construction.

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**Discussion:**

- How is the interaction with homeowners expected to proceed?

The City expects the Contractor to negotiate in good faith with the homeowners to offer a fair price to replace water and or sewer service lines from the curb box to the house. The residents are being informed of the health risks of partial lead line replacement, and the City expects a large number of residents to request full replacement. The Contractor and home owner will be the parties involved in the agreement, and if payment to the Contractor is not made within 90 days, the City will underwrite the payment to the Contractor. The residents are being offered a 7 year loan from the City, if they accept the financing the City will receive the payment. The homeowners are also free to hire another contractor to perform the work.

The contract lists 98 curb boxes and 756.5 m of no corrode sanitary sewer to be replaced. For the purposes of tendering and scheduling, the Contractor should assume that 42 of these property owners will request full replacement. The intent of this assumption is not to provide an exact number of replacements but to provide an approximate quantity of potential private work for water and sanitary services.

If the Contractor performs more than this amount, they shall submit a scope change to request a change in schedule.

- For the 400 mm PVC, what DR rating is required?

Pressure rating shall be DR18. Refer to the updated specification 2.3 Polyvinyl Chloride (PVC) Pipe.

- If a hydrant is identified as being replaced, but has been replaced recently, is the hydrant to be replaced?

If a hydrant has recently been replaced, it shall be left in place and connected to the new watermain.

- Does the City have a record of the number and location of repair clamps on pipe-bursting locations?

The City has a record of the number per block, but not the location.

- Will there be more effort put in to replacing existing deficient curb and gutter?

The Engineer and City will work with the Contractor to identify areas where curb and gutter



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**Discussion:**

should be replaced.

- For the 30 mm overlay, can the payment item be measured by tonne rather than by square metre?

The Bid Form has been amended for asphalt overlay to be paid by tonne. The quantity remains the same, a 30 mm overlay on all trenched roadways.

- For concrete work, can sidewalk be measured by square metres rather than lineal metres to account for differences in sidewalk width?

The Bid Form has been amended for sidewalk to be paid by square metre.

#### **4 MEETING CLOSE**

Attendees were informed that handouts and minutes stemming from the meeting did not form an official part of the addendum or contract. Official clarification will be provided via the forthcoming addendum.

Encl.:

Sign in Sheet  
Queries During Bid Period

