



THE CITY OF WINNIPEG

TENDER

TENDER NO. 805-2019

**RDS SCADA SYSTEM UPGRADE, PLC REPLACEMENT, AND POWER
RELIABILITY UPGRADES**

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PART B - BIDDING PROCEDURES

B1. CONTRACT TITLE

B1.1 RDS SCADA SYSTEM UPGRADE, PLC REPLACEMENT, AND POWER RELIABILITY UPGRADES

B2. SUBMISSION DEADLINE

B2.1 The Submission Deadline is 12:00 noon Winnipeg time, September 16, 2020.

B2.2 The Contract Administrator or the Manager of Materials may extend the Submission Deadline by issuing an addendum at any time prior to the time and date specified in B2.1.

B3. SITE INVESTIGATION

B3.1 Further to C3.1, the local facilities Site investigation will take place on August 11, 2020.

B3.1.1 The local facilities Site investigation shall commence at 09:00 a.m. at the McPhillips RPS (360 McPhillips Street, Winnipeg, Manitoba). The Contract Administrator or an authorized representative will be available to provide Bidders access to the Site.

B3.1.2 Following the McPhillips RPS, the Site investigation will continue to the TBPS, WTP, and conclude at the DBPS and DCFF.

B3.1.3 Transportation to and between the facilities will be the responsibility of the Bidder.

B3.1.4 Bidders will not be permitted to join the Site investigation once it has commenced.

B3.1.5 Depending on the number of Bidders anticipated to take part in the local facilities Site investigation and the COVID-19 requirements at the time of the Site investigation, a second Site investigation date for all facilities excluding the SLAIF may be proposed.

B3.2 Further to C3.1, the remote facilities Site investigation will take place on August 13, 2020.

B3.2.1 The remote facilities Site investigation shall commence at 09:00 a.m. at Mile 82.44 on the Trans-Canada Highway, approximately seven (7) kilometres east of East Braintree, Manitoba. The Contract Administrator or an authorized representative will be available to provide Bidders access to the Site.

(a) Bidders should be advised that the drive from Deacon's Corner to Mile 82.44 is approximately 65 minutes. The nearest kilometre marking on the Trans-Canada is 458 and Bidders will need to turn south onto the road denoted "Road 85E". Note there is a safety yellow and white marker on the stop sign post indicating that this is Mile 82.44 (aqueduct distance).

B3.2.2 Bidders will be required to travel via the GWWD Railway to access the SLAIF.

(a) Mile 82.44 serves as the pick-up point for access to the GWWD Railway which will then be used to access the SLAIF.

(b) A signed GWWD Railway waiver form must be submitted by each attendant when they pre-register for the Site investigation. The waiver is included in Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information).

(c) Restrictions will be placed on the number of people transported to the SLAIF via the GWWD Railway to comply with social distancing requirements associated with COVID-19.

B3.2.3 Bidders will not be able to join the Site investigation once it has commenced.

B3.2.4 Depending on the number of Bidders anticipated to take part in the remote facilities Site investigation and the COVID-19 requirements at the time of the Site investigation, a second Site investigation may take place and has been scheduled for August 18, 2020.

- B3.3 Bidders must pre-register for all Site investigations with the Contract Administrator listed in D5.1 a minimum of seventy-two (72) hours prior to the Site investigation.
- B3.4 CSA approved safety footwear are required for all attendants of the Site investigations.
- B3.5 The Bidder is advised that the Site investigations are optional. However, the City strongly suggests the Bidder attend.
- B3.6 Bidders are not permitted to take photographs or videos at the Site investigations. The Bidder may request pictures of specific areas or equipment from the Contract Administrator. Subject to the City's approval, the requested photographs will be issued via addendum.
- B3.7 Further to D20, the City acknowledges that COVID-19 may impact how the Site investigations are conducted and a number of protocols have been implemented for the safety of all participants.
- B3.7.1 A limit of one (1) representative per company will be permitted at each Site investigation to facilitate social distancing protocols.
- B3.7.2 The Site investigations shall be carried out in accordance with the applicable Federal, Provincial, and local government regulations for COVID-19 current at the time of the Site investigations. Bidders should be aware that the Contract Administrator will conduct a screening assessment based on these regulations (e.g. exhibiting symptoms, recent travel, etc.) at the commencement of the Site investigations. Any attendants for the Site investigations who do not pass all associated screening questions will not be permitted to attend the Site investigations.
- B3.7.3 Notwithstanding B3.7.2, each attendee will be required to wear a face mask at all times during the Site investigation, exercise good hygiene practices, and maintain social distancing of a minimum of two (2) m.
- B3.8 Notwithstanding B3.1 and B3.2, the City may cancel or reschedule the Site investigations due to health and safety concerns stemming from COVID-19 or to adhere to current COVID-19 regulations.
- B3.8.1 In the event that the Site investigations are unable to be held due to COVID-19, the City will consider providing virtual tours of the facilities outlined in B3.1 and B3.2. This may include photographs and/or videos. Bidders will be provided the opportunity to request specific photographs and videos, subject to the City's approval.
- B3.9 Bidders wishing to register for the Site investigation shall provide the Contract Administrator with a Public Safety Verification search obtained not earlier than one (1) year prior to the Site investigation.
- B3.9.1 The Public Safety Verification Check shall be obtained in accordance with F1.1.1.
- B3.9.2 The Bidder should be aware that the Public Safety Verification Check process is not immediate and should be completed well in advance of the Site investigation.
- B3.9.3 Bidders will need to register for an account at least seventy-two (72) hours prior to requesting a Public Safety Verification Check. Following completion of account registration, Bidders should be aware that the Public Safety Verification Check can take up to forty-eight (48) hours to complete.
- B3.10 Access to view the Sites can only be made under the supervision of an authorized City representative.
- B3.11 The Bidder shall not be entitled to rely on any information or interpretation received at the Site investigation unless that information or interpretation is the Bidder's direct observation, or is provided by the Contract Administrator in writing.
- B3.12 The Bidder is responsible for determining:

- (a) the location, nature, quality, or quantity of the materials to be removed or to be employed in the performance of the Work;
- (b) all matters concerning access to the Site, power supplies, location of existing services, utilities, or materials necessary for the completion of the Work; and
- (c) all other matters which could in any way affect their Bid or the performance of the Work.

B4. ENQUIRIES

- B4.1 All enquiries shall be directed to the Contract Administrator identified in D5.1.
- B4.2 If the Bidder finds errors, discrepancies, or omissions in the Tender, or is unsure of the meaning or intent of any provision therein, the Bidder shall notify the Contract Administrator of the error, discrepancy, or omission, or request a clarification as to the meaning or intent of the provision at least five (5) Business Days prior to the Submission Deadline.
- B4.3 Responses to enquiries which, in the sole judgment of the Contract Administrator, require a correction to or a clarification of the Tender will be provided by the Contract Administrator to all Bidders by issuing an addendum.
- B4.4 Responses to enquiries which, in the sole judgment of the Contract Administrator, do not require a correction to or a clarification of the Tender will be provided by the Contract Administrator only to the Bidder who made the enquiry.
- B4.5 The Bidder shall not be entitled to rely on any response or interpretation received pursuant to B4 unless that response or interpretation is provided by the Contract Administrator in writing.
- B4.6 Any enquiries concerning submitting through MERX should be addressed to:
MERX Customer Support
Phone: 1-800-964-6379
Email: merx@merx.com

B5. CONFIDENTIALITY

- B5.1 Information provided to a Bidder by the City or acquired by a Bidder by way of further enquiries or through investigation is confidential. Such information shall not be used or disclosed in any way without the prior written authorization of the Contract Administrator. The use and disclosure of the confidential information shall not apply to information which:
- (a) was known to the Bidder before receipt hereof; or
 - (b) becomes publicly known other than through the Bidder; or
 - (c) is disclosed pursuant to the requirements of a governmental authority or judicial order.
- B5.2 The Bidder shall not make any statement of fact or opinion regarding any aspect of the Tender to the media or any member of the public without the prior written authorization of the Contract Administrator.

B6. ADDENDA

- B6.1 The Contract Administrator may, at any time prior to the Submission Deadline, issue addenda correcting errors, discrepancies, or omissions in the Tender, or clarifying the meaning or intent of any provision therein.
- B6.2 The Contract Administrator will issue each addendum at least two (2) Business Days prior to the Submission Deadline, or provide at least two (2) Business Days by extending the Submission Deadline.
- B6.3 Addenda will be available on the on the MERX website at www.merx.com.

- B6.4 The Bidder is responsible for ensuring that he/she has received all addenda and is advised to check the MERX website for addenda regularly and shortly before the Submission Deadline, as may be amended by addendum.
- B6.5 The Bidder shall acknowledge receipt of each addendum in Paragraph 10 of Form A: Bid/Proposal. Failure to acknowledge receipt of an addendum may render a Bid non-responsive.
- B6.6 Notwithstanding B4, enquiries related to an addendum may be directed to the Contract Administrator indicated in D5.1.

B7. SUBSTITUTES

- B7.1 The Work is based on the Plant, Materials, and methods specified in the Tender.
- B7.2 Substitutions shall not be allowed unless application has been made to and prior approval has been granted by the Contract Administrator in writing.
- B7.3 Requests for approval of a substitute will not be considered unless received in writing by the Contract Administrator at least ten (10) Business Days prior to the Submission Deadline.
- B7.4 The Bidder shall ensure that any and all requests for approval of a substitute:
- (a) provide sufficient information and details to enable the Contract Administrator to determine the acceptability of the Plant, Material, or method as either an approved equal or alternative;
 - (b) identify any and all changes required in the applicable Work, and all changes to any other Work, which would become necessary to accommodate the substitute;
 - (c) identify any anticipated cost or time savings that may be associated with the substitute;
 - (d) certify that, in the case of a request for approval as an approved equal, the substitute will fully perform the functions called for by the general design, be of equal or superior substance to that specified, is suited to the same use and capable of performing the same function as that specified, and can be incorporated into the Work, strictly in accordance with the proposed Work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance;
 - (e) certify that, in the case of a request for approval as an approved alternative, the substitute will adequately perform the functions called for by the general design, be similar in substance to that specified, is suited to the same use and capable of performing the same function as that specified, and can be incorporated into the Work, strictly in accordance with the proposed Work schedule and the dates specified in the Supplemental Conditions for Substantial Performance and Total Performance.
- B7.5 The Contract Administrator, after assessing the request for approval of a substitute, may in his/her sole discretion grant approval for the use of a substitute as an “approved equal” or as an “approved alternative”, or may refuse to grant approval of the substitute.
- B7.6 The Contract Administrator will provide a response in writing, at least two (2) Business Days prior to the Submission Deadline, to the Bidder who requested approval of the substitute.
- B7.6.1 The Contract Administrator will issue an addendum, disclosing the approved materials, equipment, methods, and products to all potential Bidders. The Bidder requesting and obtaining the approval of a substitute shall be responsible for disseminating information regarding the approval to any person or persons he/she wishes to inform.
- B7.7 If the Contract Administrator approves a substitute as an “approved equal”, any Bidder may use the approved equal in place of the specified item.
- B7.8 If the Contract Administrator approves a substitute as an “approved alternative”, any Bidder bidding that approved alternative may base his/her Total Bid Price upon the specified item but

may also indicate an alternative price based upon the approved alternative. Such alternatives will be evaluated in accordance with B18.

- B7.9 No later claim by the Contractor for an addition to the Total Bid Price because of any other changes in the Work necessitated by the use of an approved equal or an approved alternative will be considered.

B8. BID COMPONENTS

- B8.1 The Bid shall consist of the following components:

- (a) Form A: Bid/Proposal;
- (b) Form B: Prices;
- (c) Form G1: Bid Bond and Agreement to Bond.

- B8.2 Further to B8.1, the Bidder should include the written correspondence from the Contract Administrator approving a substitute in accordance with B7.

- B8.3 All components of the Bid shall be fully completed or provided, and submitted by the Bidder no later than the Submission Deadline, with all required entries made clearly and completely.

- B8.4 The Bid shall be submitted electronically through MERX at www.merx.com

- B8.4.1 Bids will **only** be accepted electronically through MERX.

- B8.5 Bidders are advised that inclusion of terms and conditions inconsistent with the Tender document, including the *General Conditions for Construction*, will be evaluated in accordance with B18.1(a).

B9. BID

- B9.1 The Bidder shall complete Form A: Bid/Proposal, making all required entries.

- B9.2 Paragraph 2 of Form A: Bid/Proposal shall be completed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, his/her name shall be inserted;
- (b) if the Bidder is a partnership, the full name of the partnership shall be inserted;
- (c) if the Bidder is a corporation, the full name of the corporation shall be inserted;
- (d) if the Bidder is carrying on business under a name other than his/her own, the business name and the name of every partner or corporation who is the owner of such business name shall be inserted.

- B9.2.1 If a Bid is submitted jointly by two (2) or more persons, each and all such persons shall identify themselves in accordance with B9.2.

- B9.3 In Paragraph 3 of Form A: Bid/Proposal, the Bidder shall identify a contact person who is authorized to represent the Bidder for purposes of the Bid.

- B9.4 Paragraph 13 of Form A: Bid/Proposal shall be signed in accordance with the following requirements:

- (a) if the Bidder is a sole proprietor carrying on business in his/her own name, it shall be signed by the Bidder;
- (b) if the Bidder is a partnership, it shall be signed by the partner or partners who have authority to sign for the partnership;
- (c) if the Bidder is a corporation, it shall be signed by its duly authorized officer or officers;

- (d) if the Bidder is carrying on business under a name other than his/her own, it shall be signed by the registered owner of the business name, or by the registered owner's authorized officials if the owner is a partnership or a corporation.

B9.4.1 The name and official capacity of all individuals signing Form A: Bid/Proposal should be entered below such signatures.

B9.5 If a Bid is submitted jointly by two (2) or more persons, the word "Bidder" shall mean each and all such persons, and the undertakings, covenants and obligations of such joint Bidders in the Bid and the Contract, when awarded, shall be both joint and several.

B10. PRICES

B10.1 The Bidder shall state a price in Canadian funds for each item of the Work identified on Form B: Prices.

B10.1.1 Notwithstanding C12.2.3(c), prices on Form B: Prices shall not include the Manitoba Retail Sales Tax (MRST, also known as PST), which shall be extra where applicable.

B10.1.2 Prices stated on Form B: Prices shall not include any costs which may be incurred by the Contractor with respect to any applicable funding agreement obligations as outlined in D29. Any such costs shall be determined in accordance with D29.

B10.2 The quantities listed on Form B: Prices are to be considered approximate only. The City will use said quantities for the purpose of comparing Bids.

B10.3 The quantities for which payment will be made to the Contractor are to be determined by the Work actually performed and completed by the Contractor, to be measured as specified in the applicable Specifications.

B10.4 Payments to Non-Resident Contractors are subject to Non-Resident Withholding Tax pursuant to the Income Tax Act (Canada).

B10.5 The Bidder shall enter the Total Bid Price from Form B: Prices into the Total Bid Price field in MERX.

B10.5.1 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

B11. DISCLOSURE

B11.1 Various Persons provided information or services with respect to this Work. In the City's opinion, this relationship or association does not create a Conflict of Interest because of this full disclosure. Where applicable, additional material available as a result of contact with these Persons is listed below.

B11.2 The Persons are:

- (a) AECOM Canada Ltd.;
 - (i) Shoal Lake Aqueduct Intake Facility Assessment – Site Inspections and Assessment, AECOM Canada Ltd., 2012;
- (b) SNC-Lavalin Inc.;
 - (i) Water Pumping Stations Power Reliability Study, SNC-Lavalin Inc., 2008;
 - (ii) Deacon Chemical Feed Building Power Reliability Study, SNC-Lavalin INC., 2011;
 - (iii) Regional Water Distribution System PLC Replacement & Power Reliability Upgrades Preliminary Design Report, SNC-Lavalin Inc., 2013;
- (c) Stantec Consulting Ltd;
 - (i) Water Pumping Stations, Fast Restart Analysis and Recommendations, Stantec Consulting Ltd., 2016;

- (d) Shermco Industries Inc.;
 - (i) Regional Water Distribution System SCADA System Upgrade, PLC Replacement and Power Reliability Upgrades Preliminary Design Report, Dillon Consulting Limited, 2018;
- (e) Powerland Computers Ltd;
 - (i) Regional Water Distribution System SCADA System Upgrade, PLC Replacement and Power Reliability Upgrades Preliminary Design Report, Dillon Consulting Limited, 2018.

B11.3 Additional Material:

- (a) Water Pumping Stations Power Reliability Study, SNC-Lavalin Inc., 2008;
- (b) Deacon Chemical Feed Building Power Reliability Study, SNC-Lavalin INC., 2011;
- (c) Shoal Lake Aqueduct Intake Facility Assessment – Site Inspections and Assessment, AECOM Canada Ltd., 2012;
- (d) Regional Water Distribution System PLC Replacement & Power Reliability Upgrades Preliminary Design Report, SNC-Lavalin Inc., 2013;
- (e) Regional Water Distribution SCADA System Upgrade Study, Dillon Consulting Limited, 2015;
- (f) Water Pumping Stations, Fast Restart Analysis and Recommendations, Stantec Consulting Ltd., 2016; and
- (g) Regional Water Distribution System SCADA System Upgrade, PLC Replacement and Power Reliability Upgrades Preliminary Design Report, Dillon Consulting Limited, 2018.

B11.4 The reports listed in B11.3(a) to B11.3(g) are available in electronic pdf by request to the Contract Administrator.

B11.4.1 In order to receive the document(s) listed above, a written request shall be submitted to the Contract Administrator. A signed non-disclosure agreement form will be required prior to issuance of the document(s). A sample non-disclosure agreement has been included in Appendix O – Sample Non-Disclosure Agreement for reference. Upon receipt of the written request and signed non-disclosure agreement form, the requested document(s) will be provided.

B12. CONFLICT OF INTEREST AND GOOD FAITH

B12.1 Further to C3.2, Bidders, by responding to this Tender, declare that no Conflict of Interest currently exists, or is reasonably expected to exist in the future.

B12.2 Conflict of Interest means any situation or circumstance where a Bidder or employee of the Bidder proposed for the Work has:

- (a) other commitments;
- (b) relationships;
- (c) financial interests; or
- (d) involvement in ongoing litigation;

that could or would be seen to:

- (i) exercise an improper influence over the objective, unbiased and impartial exercise of the independent judgment of the City with respect to the evaluation of Bids or award of the Contract; or
 - (ii) compromise, impair, or be incompatible with the effective performance of a Bidder's obligations under the Contract;
- (e) has contractual or other obligations to the City that could or would be seen to have been compromised or impaired as a result of its participation in the Tender process or the Work;
or

- (f) has knowledge of confidential information (other than confidential information that is disclosed by the City in the normal course of the Tender process) of strategic and/or material relevance to the Tender process or to the Work that is not available to other Bidders and that could or would be seen to give that Bidder an unfair competitive advantage.

B12.3 In connection with its Bid, each entity identified in B12.2 shall:

- (a) avoid any perceived, potential, or actual Conflict of Interest in relation to the procurement process and the Work;
- (b) upon discovering any perceived, potential, or actual Conflict of Interest at any time during the Tender process, promptly disclose a detailed description of the Conflict of Interest to the City in a written statement to the Contract Administrator; and
- (c) provide the City with the proposed means to avoid or mitigate, to the greatest extent practicable, any perceived, potential, or actual Conflict of Interest and shall submit any additional information to the City that the City considers necessary to properly assess the perceived, potential, or actual Conflict of Interest.

B12.4 Without limiting B12.3, the City may, in its sole discretion, waive any and all perceived, potential, or actual Conflicts of Interest. The City's waiver may be based upon such terms and conditions as the City, in its sole discretion, requires to satisfy itself that the Conflict of Interest has been appropriately avoided or mitigated, including requiring the Bidder to put into place such policies, procedures, measures, and other safeguards as may be required by and be acceptable to the City, in its sole discretion, to avoid or mitigate the impact of such Conflict of Interest.

B12.5 Without limiting B12.3, and in addition to all contractual or other rights or rights at law or in equity or legislation that may be available to the City, the City may, in its sole discretion:

- (a) disqualify a Bidder that fails to disclose a perceived, potential, or actual Conflict of Interest of the Bidder or any of its employees proposed for the Work;
- (b) require the removal or replacement of any employees proposed for the Work that has a perceived, actual, or potential Conflict of Interest that the City, in its sole discretion, determines cannot be avoided or mitigated;
- (c) disqualify a Bidder or employees proposed for the Work that fails to comply with any requirements prescribed by the City pursuant to B12.4 to avoid or mitigate a Conflict of Interest; and
- (d) disqualify a Bidder if the Bidder, or one of its employees proposed for the Work, has a perceived, potential, or actual Conflict of Interest that, in the City's sole discretion, cannot be avoided or mitigated, or otherwise resolved.

B12.6 The determination of whether a perceived, potential, or actual Conflict of Interest exists shall be made by the City, in its sole discretion.

B13. QUALIFICATION

B13.1 The Bidder shall:

- (a) undertake to be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed, or permitted by law to carry on business in Manitoba;
- (b) be financially capable of carrying out the terms of the Contract; and
- (c) have all the necessary experience, capital, organization, and equipment to perform the Work in strict accordance with the terms and provisions of the Contract.

B13.2 The Bidder and any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) be responsible and not be suspended, debarred, or in default of any obligations to the City. A list of suspended or debarred individuals and companies is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <https://www.winnipeg.ca/matmgt/Templates/files/debar.pdf>

B13.3 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) have successfully carried out recent electrical and instrumentation work for water or wastewater treatment and pumping stations or equivalent, similar in nature, scope, and value to the Work;
- (b) be fully capable of performing the Work required to be in strict accordance with the terms and provisions of the Contract;
- (c) have a written workplace safety and health program if required pursuant to The Workplace Safety and Health Act (Manitoba); and
- (d) upon request of the Contract Administrator, provide the security clearances in accordance with PART F - Security Clearance.

B13.4 The Bidder and/or any proposed Subcontractor (for the portion of the Work proposed to be subcontracted to them) shall:

- (a) employ a lead journeyman with ten (10) years' experience with voltages up to 4160 VAC;
 - (i) upon request by the Contract Administrator, submit a CV for the project team member describing previous project experience with voltages up to 4160 VAC including the team member's role on the projects. Include one (1) current client reference;
- (b) employ a team member that has ten (10) years' experience in PLC programming;
 - (i) upon request by the Contract Administrator, submit a CV for the project team member describing previous PLC programming project experience including the team member's role on the projects. Include one (1) current client reference;
- (c) employ a team member that has ten (10) years' experience in SCADA system programming;
 - (i) upon request by the Contract Administrator, submit a CV for the project team member describing previous SCADA system programming project experience including the team member's role on the projects. Include one (1) current client reference;
- (d) employ a team member that has completed or will complete within six (6) months of award the Schneider Electric – EcoStruxure Control Expert training;
 - (i) upon request by the Contract Administrator, submit a training certificate or proof of registration;
- (e) employ a team member that has experience in programming using Unity Pro or EcoStruxure Control Expert;
 - (i) upon request by the Contract Administrator, submit a project description including the team member's role on the project and description of the work completed. Include one (1) current client reference;
- (f) employ a team member that has completed or will complete within six (6) months of award the Wonderware – Application Developer certification and System Integrator Partner certification;
 - (i) upon request by the Contract Administrator, submit a training certificate or proof of registration;
- (g) employ a team member that has completed or will complete within six (6) months of award the Wonderware – Application Server 2017, Wonderware – Historian Client 2017, and Wonderware – InTouch for System Platform 2017 training;
 - (i) upon request by the Contract Administrator, submit a training certificate or proof of registration;

- (h) employ a team member that has obtained or will obtain within six (6) months of award the VEAM – Veeam Certified Engineer certification;
 - (i) upon request by the Contract Administrator, submit a certificate of certification or proof of registration;
- (i) employ a team member that has obtained or will obtain within six (6) months of award the VEAM – Veeam Certified Architect certification;
 - (i) upon request by the Contract Administrator, submit a certificate of certification or proof of registration;
- (j) employ a team member that has obtained or will obtain within six (6) months of award the VMWare VCP-DCV, VCAP-DCV (Deployment), and VCAP-DCV (Deploy) certification;
 - (i) upon request by the Contract Administrator, submit a certificate of certification or proof of registration;
- (k) employ a team member that has completed or will complete within six (6) months of award the RuggedCom Siemens ITIN, Siemens CEIN, Siemens CPIN, or equivalent training;
 - (i) upon request by the Contract Administrator, submit a training certificate or proof of registration;
- (l) have two (2) qualified people available to provide twenty-four (24)-hour, seven (7) days a week remote and Site support throughout the construction and warranty period;
 - (i) upon request by the Contract Administrator, submit a CV for each of the project team members responsible for twenty-four (24) hour, seven (7) days a week remote and Site support describing previous support experience including the team member's role on the projects. Include one current client reference with each CV; and
- (m) have experience with projects with a PLC I/O count greater than five hundred (500);
 - (i) upon request by the Contract Administrator, submit a project description (completed in the last ten (10) years) outlining the team member's role on the project and description of the work completed. Include one current client reference.

B13.5 Further to B13.3(c), the Bidder shall, within five (5) Business Days of a request by the Contract Administrator, provide proof satisfactory to the Contract Administrator that the Bidder/Subcontractor has a workplace safety and health program meeting the requirements of The Workplace Safety and Health Act (Manitoba), by providing:

- (a) written confirmation of a safety and health certification meeting SAFE Work Manitoba's SAFE Work Certified Standard (e.g., COR™ and SECOR™) in the form of:
 - (i) a copy of their valid Manitoba Certificate of Recognition (COR™) certificate and letter of good standing (or Manitoba equivalency) as issued under the COR™ program administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ program; or
 - (ii) a copy of their valid Manitoba SECOR™ certificate and letter of good standing (or Manitoba equivalency) as issued under the Small Employer Certificate of Recognition Program (SECOR™) administered by the Construction Safety Association of Manitoba or by the Manitoba Heavy Construction Association's WORKSAFELY™ COR™ program; or
- (b) a report or letter to that effect from an independent reviewer acceptable to the City. A list of acceptable reviewers and the review template are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/>.

B13.6 The Bidder shall submit, within five (5) Business Days of a request by the Contract Administrator, proof satisfactory to the Contract Administrator of the qualifications of the Bidder and of any proposed Subcontractor.

B13.6.1 Where a Bidder is unable to provide proof of qualifications satisfactory to the Contract Administrator, the Bidder will be provided the opportunity to resubmit qualifications, within a timeframe agreed to by the Contract Administrator.

B13.7 The Bidder shall provide, on the request of the Contract Administrator, full access to any of the Bidder's equipment and facilities to confirm, to the Contract Administrator's satisfaction, that the Bidder's equipment and facilities are adequate to perform the Work.

B14. BID SECURITY

B14.1 The Bidder shall include in its Bid Submission bid security in the form of a digital bid bond, in the amount of at least ten percent (10%) of the Total Bid Price, and agreement to bond of a company registered to conduct the business of a surety in Manitoba, in Form G1: Bid Bond and Agreement to Bond, available on The City of Winnipeg, Corporate Finance, Materials Management Division website at <https://www.winnipeg.ca/MatMgt/templates/files/eBidsecurity.pdf>.

B14.2 Bid security shall be submitted in a digital format meeting the following criteria:

- (a) the version submitted by the Bidder must have valid digital signatures and seals;
- (b) the version submitted by the Bidder must be verifiable by the City with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; and digital seals; with the surety company, or an approved verification service provider of the surety company;
- (c) the version submitted must be viewable, printable, and storable in standard electronic file formats compatible with the City, and in a single file. Allowable formats include pdf.
- (d) the verification may be conducted by the City immediately or at any time during the life of the bond and at the discretion of the City with no requirement for passwords or fees; and
- (e) the results of the verification must provide a clear, immediate, and printable indication of pass or fail regarding B14.2(b).

B14.3 Bonds failing the verification process will not be considered to be valid and the Bid shall be determined to be non-responsive in accordance with B18.1(a).

B14.4 Bonds passing the verification process will be treated as original and authentic.

B14.4.1 If the Bidder submits alternative Bids, the bid security shall be in the amount of the specified percentage of the highest Total Bid Price submitted.

B14.5 The bid security of the successful Bidder and the next two lowest evaluated responsive and responsible Bidders will be released by the City when a Contract for the Work has been duly formed with the successful Bidder and the contract securities are furnished as provided herein. The bid securities of all other Bidders will be released when a Contract is awarded.

B14.6 The bid securities of all Bidders will be released by the City as soon as practicable following notification by the Contract Administrator to the Bidders that no award of Contract will be made pursuant to the Tender.

B15. OPENING OF BIDS AND RELEASE OF INFORMATION

B15.1 Bids will not be opened publicly.

B15.2 Following the Submission Deadline, the names of the Bidders and their Total Bid Prices (unevaluated and pending review and verification of conformance with requirements) will be available on the MERX website at www.merx.com.

B15.3 After award of Contract, the name(s) of the successful Bidder(s) and their Contract amount(s) will be available on the MERX website at www.merx.com.

B15.4 The Bidder is advised that any information contained in any Bid may be released if required by The Freedom of Information and Protection of Privacy Act (Manitoba), by other Authorities Having Jurisdiction, or by law or by City policy or procedures (which may include access by members of City Council).

B15.4.1 To the extent permitted, the City shall treat as confidential information, those aspects of a Bid Submission identified by the Bidder as such in accordance with and by reference to Part 2, Section 17 or Section 18 or Section 26 of The Freedom of Information and Protection of Privacy Act (Manitoba), as amended.

B16. IRREVOCABLE BID

B16.1 The Bid(s) submitted by the Bidder shall be irrevocable for the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B16.2 The acceptance by the City of any Bid shall not release the Bids of the next two lowest evaluated responsive Bidders and these Bidders shall be bound by their Bids on such Work until a Contract for the Work has been duly formed and the contract securities have been furnished as herein provided, but any Bid shall be deemed to have lapsed unless accepted within the time period specified in Paragraph 11 of Form A: Bid/Proposal.

B17. WITHDRAWAL OF BIDS

B17.1 A Bidder may withdraw his/her Bid without penalty prior to the Submission Deadline.

B18. EVALUATION OF BIDS

B18.1 Award of the Contract shall be based on the following bid evaluation criteria:

- (a) compliance by the Bidder with the requirements of the Tender, or acceptable deviation there from (pass/fail);
- (b) qualifications of the Bidder and the Subcontractors, if any, pursuant to B13 (pass/fail);
- (c) Total Bid Price; and
- (d) economic analysis of any approved alternative pursuant to B7.

B18.2 Further to B18.1(a), the Award Authority may reject a Bid as being non-responsive if the Bid is incomplete, obscure or conditional, or contains additions, deletions, alterations, or other irregularities. The Award Authority may reject all or any part of any Bid, or waive technical requirements or minor informalities or irregularities, if the interests of the City so require.

B18.3 Further to B18.1(b), the Award Authority shall reject any Bid submitted by a Bidder who does not demonstrate, in his/her Bid or in other information required to be submitted, that he/she is qualified.

B18.4 Further to B18.1(c), the Total Bid Price shall be the sum of the quantities multiplied by the unit prices for each item shown on Form B: Prices.

B18.4.1 Further to B18.1(a), in the event that a unit price is not provided on Form B: Prices, the City may determine the unit price by dividing the amount (extended price) by the approximate quantity, for the purposes of evaluation and payment.

B18.4.2 Bidders are advised that the calculation indicated in B18.4 will prevail over the Total Bid Price entered in MERX.

B19. AWARD OF CONTRACT

B19.1 The City will give notice of the award of the Contract or will give notice that no award will be made.

- B19.2 The City will have no obligation to award a Contract to a Bidder, even though one (1) or all of the Bidders are determined to be qualified, and the Bids are determined to be responsive.
- B19.2.1 Without limiting the generality of B19.2, the City will have no obligation to award a Contract where:
- (a) the prices exceed the available City funds for the Work;
 - (b) the prices are materially in excess of the prices received for similar work in the past;
 - (c) the prices are materially in excess of the City's cost to perform the Work, or a significant portion thereof, with its own forces;
 - (d) only one (1) Bid is received; or
 - (e) in the judgment of the Award Authority, the interests of the City would best be served by not awarding a Contract.
- B19.3 If funding for the Work is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, Bidders are advised that the terms of D29 shall immediately take effect upon confirmation of such funding, regardless of when funding is confirmed.
- B19.4 Where an award of Contract is made by the City, the award shall be made to the qualified Bidder submitting the lowest evaluated responsive Bid, in accordance with B18.
- B19.4.1 Following the award of contract, a Bidder will be provided with information related to the evaluation of his/her Bid upon written request to the Contract Administrator.

PART C - GENERAL CONDITIONS

C0. GENERAL CONDITIONS

- C0.1 The *General Conditions for Construction* (Revision 2020-01-31) are applicable to the Work of the Contract.
- C0.1.1 The *General Conditions for Construction* are available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at http://www.winnipeg.ca/matmgt/gen_cond.stm
- C0.2 A reference in the Tender to a section, clause or subclause with the prefix “**C**” designates a section, clause or subclause in the *General Conditions for Construction*.

PART D - SUPPLEMENTAL CONDITIONS

GENERAL

D1. GENERAL CONDITIONS

D1.1 In addition to the *General Conditions for Construction*, these Supplemental Conditions are applicable to the Work of the Contract.

D2. FORM OF CONTRACT DOCUMENTS

D2.1 Notwithstanding C4.1(c) and C4.4, the Contract Documents will be provided to the Contractor electronically and there will be no requirement for execution and return to the City by the Contractor. Accordingly, the provisions under C4.4(a) and C4.4(b) are no longer applicable.

D3. SCOPE OF WORK

D3.1 The Work to be done under the Contract shall consist of the supply, installation, programming, testing, start-up, commissioning, training, and support for a complete SCADA system replacement, and PLC system and power reliability upgrades for the City's RDS.

D3.2 The major components of the Work are as follows:

D3.2.1 General

- (a) programming and configuration Work for the PLCs and SCADA system, including the associated FAT;
- (b) mobilization and demobilization for each facility;
- (c) demolition of existing equipment to be replaced, upgraded, or abandoned at all facilities;
- (d) minor asbestos abatement at facilities where required;
- (e) minor structural repairs as required for each facility;
- (f) installation of new equipment;
- (g) start-up and commissioning;
- (h) training;
- (i) facility and project closeout including the provision of project documentation; and
- (j) technical support and warranty services during the construction and warranty period.

D3.2.2 Site Specific

- (a) RDS/WTP SCADA Integration
 - (i) integration of the new SCADA System including, but not limited to, provision of configuration and programming and installation of associated equipment and software;
- (b) TBPS
 - (i) SCADA workstation replacement;
 - (ii) PLC systems programming and replacements;
 - (iii) PMCM system replacement;
 - (iv) control panel upgrades;
 - (v) new instrumentation;
 - (vi) new Ethernet equipment and cabling;
 - (vii) 120 VAC UPS power distribution upgrades;

- (c) SLAIF
 - (i) SCADA workstation replacement;
 - (ii) LHMI replacements;
 - (iii) PLC systems programming and replacements;
 - (iv) PMCM system replacement;
 - (v) control panel upgrades;
 - (vi) new Ethernet equipment and cabling;
- (d) McPhillips RPS
 - (i) SCADA workstation replacement;
 - (ii) PLC systems programming and replacements;
 - (iii) PMCM system replacement;
 - (iv) control panel upgrades;
 - (v) new instrumentation;
 - (vi) new Ethernet equipment and cabling;
 - (vii) 120 VAC UPS power distribution upgrades;
 - (viii) 4160 VAC pump motor starter upgrades;
- (e) MacLean RPS
 - (i) SCADA workstation replacement;
 - (ii) PLC systems programming and replacements;
 - (iii) PMCM system replacement;
 - (iv) control panel upgrades;
 - (v) new instrumentation;
 - (vi) new Ethernet equipment and cabling;
 - (vii) 120 VAC UPS power distribution upgrades;
 - (viii) 4160 VAC pump motor starter upgrades;
- (f) Hurst RPS
 - (i) SCADA workstation replacement;
 - (ii) PLC systems programming and replacements;
 - (iii) PMCM system replacement;
 - (iv) control panel upgrades;
 - (v) new instrumentation;
 - (vi) new Ethernet equipment and cabling;
 - (vii) 120 VAC UPS power distribution upgrades;
 - (viii) 4160 VAC pump motor starter upgrades;
- (g) DBPS and DCFF
 - (i) SCADA workstation replacements;
 - (ii) PLC systems programming and replacements;
 - (iii) PMCM system replacement;
 - (iv) control panel upgrades;
 - (v) new instrumentation;
 - (vi) new Ethernet equipment and cabling; and
 - (vii) 120 VAC UPS power distribution upgrades.

D3.3 The following shall apply to the Work:

- (a) City of Winnipeg Green Building Policy: New City-Owned Buildings and major additions;
<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeld=2&DocId=5989>
- (b) Universal Design Policy

<http://clkapps.winnipeg.ca/DMIS/DocExt/ViewDoc.asp?DocumentTypeId=2&DocId=3604>

- (c) Water and Waste Department Drawing Standard;
<https://winnipeg.ca/waterandwaste/pdfs/dept/CAD-GIS-Specifications.pdf>
- (d) Water and Waste Department Electrical Identification Standard; and
<https://winnipeg.ca/waterandwaste/pdfs/dept/IdentificationStandard.pdf>
- (e) Water and Waste Department Electrical Design Guide.
<https://winnipeg.ca/waterandwaste/pdfs/dept/ElectricalDesignGuide.pdf>

D4. DEFINITIONS

D4.1 When used in this Tender:

- (a) “**A**” means amps;
- (b) “**AC**” means alternating current;
- (c) “**ACM**” means asbestos containing materials;
- (d) “**AI**” means analogue input;
- (e) “**AO**” means analogue output;
- (f) “**AOS**” means Application Object Server;
- (g) “**ANSI**” means American National Standards Institute;
- (h) “**As-Built Drawings**” means an accurate and complete record of the construction Work undertaken by the Contractor, resulting in adjustments and markups made to the construction set of documents;
- (i) “**Authority(ies) Having Jurisdiction**” or “**AHJ**” means an organization, office or individual responsible for enforcing the requirements of a code, standard or by-law, or for approving equipment, materials, and installation or a procedure, which is typically in reference to the local inspection authority;
- (j) “**AWG**” means American wire gauge;
- (k) “**BIOS**” means basic input/output system;
- (l) “**CEC**” means the Canadian Electrical Code (CSA C22.1) plus all City of Winnipeg amendments to the code, as contained in The Winnipeg Electrical By-Law 86/2018;
- (m) “**Certificate of Final Inspection**” means the certificate of final inspections, obtained from the City of Winnipeg inspections department;
- (n) “**Certified Operator**” means City personnel who have a valid Manitoba Operator Certification;
- (o) “**Code**” or “**code**” means the latest local code applicable at the project location. Including but not limited to The Winnipeg Electrical By-Law 86/2018 and Manitoba Electrical Code;
- (p) “**Commissioning Plan**” means the document used to detail commissioning requirements, responsibilities, and schedule as described in E10.3;
- (q) “**Commissioning Team**” means the parties responsible for commissioning as described in E10.4;
- (r) “**Conflict of Interest**” has the meaning set out in B12.2;
- (s) “**C.P.M.**” means critical path method;
- (t) “**CPU**” means central processing unit;
- (u) “**CSA**” means Canadian Standards Association;
- (v) “**CT**” means current transformer;

- (w) “**DBPS**” means Deacon Booster Pumping Station;
- (x) “**DC**” means direct current;
- (y) “**DCFF**” means Deacon Chemical Feed Facility;
- (z) “**DI**” means discrete input;
- (aa) “**DNS**” means Domain Name Server;
- (bb) “**DO**” means Discrete Output;
- (cc) “**DR**” mean disaster recovery;
- (dd) “**DRS**” means Distributed Resource Scheduler;
- (ee) “**DPM**” means Distributed Power Management;
- (ff) “**DMZ**” means demilitarized zone;
- (gg) “**DNP**” means distribution network protocol;
- (hh) “**EEMAC**” means Electrical and Electronic Manufacturer’s Associate of Canada;
- (ii) “**EIA**” means Electronic Industries Alliance;
- (jj) “**EIO**” means Ethernet I/O;
- (kk) “**EMT**” means electrical metallic tubing;
- (ll) “**ESXi**” means Elastic Sky X Integrated Server;
- (mm) “**FAT**” means factory acceptance testing;
- (nn) “**FAT Plan**” means the document used to describe and plan FAT for each facility as described in E9.3;
- (oo) “**Fire Stopping Material**” means a device intended to close off an opening or penetration during fire or materials that fill openings in wall or floor assembly where a penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings;
- (pp) “**Functional Requirements Specification**” means a document produced by the Contractor detailing the PLC and SCADA system programming requirements as specified in E8;
- (qq) “**GB**” means Gigabyte;
- (rr) “**GWWD**” or “**GWWD Railway**” means the Greater Winnipeg Water District Railway, the City owned and operated rail line between the railway yard in St. Boniface (598 Plinquet Street) and the intake at Shoal Lake, used to transport personnel, equipment, and material;
- (ss) “**HA**” means high alarm;
- (tt) “**HHA**” means high high alarm;
- (uu) “**HMI**” means human machine interface;
- (vv) “**HMIS**” means Hazardous Materials Information Systems;
- (ww) “**Hurst RPS**” means Hurst Regional Pumping Station;
- (xx) “**Hz**” means Hertz;
- (yy) “**IDE**” means Integrated Development Environment;
- (zz) “**IEEE**” means Institute of Electrical and Electronics;
- (aaa) “**I/O**” means inputs/outputs;
- (bbb) “**IP**” means internet protocol;
- (ccc) “**ISA**” means Instrument Society of America;
- (ddd) “**kV**” means Kilovolts;

| | |
|--------|--|
| (eee) | “ kVA ” means Kilovoltamperes; |
| (fff) | “ kW ” means Kilowatts; |
| (ggg) | “ LA ” means low alarm; |
| (hhh) | “ LAN ” means Local Area Network; |
| (iii) | “ LHMI ” means local human machine interface; |
| (jjj) | “ LLA ” means low low alarm; |
| (kkk) | “ m ” means metre; |
| (lll) | “ mA ” means Milliampere; |
| (mmm) | “ MacLean RPS ” means MacLean Regional Pumping Station; |
| (nnn) | “ Master Electrical Contractor ” means Contractor primarily responsible for electrical work under the Contract; |
| (ooo) | “ Mbps ” means Megabits per second; |
| (ppp) | “ MCC ” means motor control centre; |
| (qqq) | “ McPhillips RPS ” means McPhillips Regional Pumping Station; |
| (rrr) | “ mm ” means millimetre; |
| (sss) | “ nm ” means nanometre; |
| (ttt) | “ MPR ” means motor protection relay; |
| (uuu) | “ NEMA ” means National Electrical Manufacturers Association; |
| (vvv) | “ O&M Manuals ” or “ O&Ms ” means operation and maintenance manuals; |
| (www) | “ OI Server ” Operations Integration Server; |
| (xxx) | “ P&ID ” means process and instrumentation diagram; |
| (yyy) | “ PDF ” or “ pdf ” means portable document format; |
| (zzz) | “ PID ” means proportional-integral-derivative; |
| (aaaa) | “ PLC ” means programmable logic controller; |
| (bbbb) | “ PMCM ” means pump and motor condition monitoring; |
| (cccc) | “ Prime Contractor ” means the prime contractor for a construction project as defined in The Workplace Safety and Health Act (Manitoba); |
| (dddd) | “ PVC ” means polyvinyl chloride; |
| (eeee) | “ RAM ” means Random Access Memory. |
| (ffff) | “ RDS ” means the City’s Regional Water Distribution System; |
| (gggg) | “ RIO ” means Remote I/O; |
| (hhhh) | “ RMS ” means root mean square; |
| (iiii) | “ RPO ” means Recovery Point Objective; |
| (jjjj) | “ RPS ” means regional pumping station; |
| (kkkk) | “ RTD ” means resistance temperature detectors; |
| (llll) | “ RTO ” means Recovery Time Objective; |
| (mmmm) | “ RTU ” means remote terminal unit; |
| (nnnn) | “ SAN ” means storage area network; |
| (oooo) | “ Safe Work Plan ” means a document that identifies the hazards associated with the Work and details the steps the contractor will take to control each hazard; |
| (pppp) | “ Safety Data Sheets ” or “ SDS ” means Safety Data Sheets or alternatively acceptable to Labour Canada; |
| (qqqq) | “ SCORM ” means Shareable Content Object Reference Model; |

- (rrrr) “**SCADA**” means Supervisory Control and Data Acquisition;
- (ssss) “**SI Metric**” means the commonly known measurement system consisting of seven base units including meter, second, mole, ampere, kelvin, candela, and kilogram;
- (tttt) “**Site Laydown Plan**” means all drawings and documentation required to clearly indicate the location, dimensions, and type of all materials, equipment, and security provisions for the Contractor’s laydown area(s) as described in E3;
- (uuuu) “**SLAIF**” means Shoal Lake Aqueduct Intake Facility;
- (vvvv) “**SPD**” means surge protection device;
- (wwww) “**Standard**” or “**standard**” means the latest standard that is in effect at the project location;
- (xxxx) “**Station Master PLC**” means the primary and standby PLCs responsible for coordinating the control of the pumping station;
- (yyyy) “**SOP**” means Standard Operating Procedures;
- (zzzz) “**Submittals**” means all submittals, such as schedules, reports, and plans, including all supporting documentation thereto, required to be submitted by the Contractor for City review in accordance with Section 01 33 00 – Submittal Procedures in the NMS and as described in D25.1;
- (aaaa) “**Submittal Schedule**” means the schedule for the submission of Submittals to the Contract Administrator in accordance with Item 1.3.7 of Section 01 33 00 – Submittal Procedures in the NMS;
- (bbbb) “**SWP**” means Safe Work Procedures;
- (cccc) “**TBPS**” means Taché Booster Pumping Station;
- (dddd) “**TCP**” means transmission control protocol;
- (eeee) “**Total Bid Price**” means the sum of the quantities multiplied by the unit prices for each item shown on the Form B: Prices completed by the Bidder;
- (ffff) “**TPSH**” means twisted pair shielded cables;
- (gggg) “**Trades and Operation Staff**” means City personnel responsible for the maintenance and operation of the RDS and WTP systems;
- (hhhh) “**Training Plan**” means a document produced by the Contractor to detail the training lessons plans and materials and associated training schedule as described in E11.4;
- (iiii) “**UDA**” means User Defined Attribute;
- (jjjj) “**UDDT**” means User Defined Data Types;
- (kkkk) “**UDO**” means User Defined Objects;
- (llll) “**ULC**” means Underwriters Laboratories Canada;
- (mmmm) “**UPS**” means uninterruptable power supply;
- (nnnn) “**USB**” means universal serial bus;
- (oooo) “**UV**” means ultraviolet;
- (pppp) “**V**” means Volts;
- (qqqq) “**VA**” means Volt Amp;
- (rrrr) “**VAC**” means voltage alternating current;
- (ssss) “**VDC**” means voltage direct current;
- (tttt) “**VLAN**” means Virtual Local Area Network;
- (uuuu) “**VM**” means virtual machines;
- (vvvv) “**WHMIS**” means Workplace Hazardous Materials Information System;

- (wwwww) **“Work Plan”** means a document that is produced by the Contractor on a weekly basis to summarize the upcoming Work, that is used by the City to facilitate the Work and the Contractor’s presence at the facilities as described in E6; and
- (xxxxx) **“WTP”** means Winnipeg Drinking Water Treatment Plant.

D5. CONTRACT ADMINISTRATOR

- D5.1 The Contract Administrator is Dillon Consulting Limited, represented by:
Robert Taylor, P. Eng.
Associate
Telephone No. 204-453-2301 ext. 4082
Email Address rtaylor@dillon.ca

- D5.2 At the pre-construction meeting, Robert Taylor will identify additional personnel representing the Contract Administrator and their respective roles and responsibilities for the Work.

D6. CONTRACTOR'S SUPERVISOR

- D6.1 At the pre-construction meeting, the Contractor shall identify his/her designated supervisor and any additional personnel representing the Contractor and their respective roles and responsibilities for the Work.

D7. NOTICES

- D7.1 Except as provided for in C22.4, all notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents, or other communications to the Contractor shall be sent to the facsimile number identified by the Contractor in Paragraph 2 of Form A: Bid/Proposal.
- D7.2 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents, or other communications to the City, except as expressly otherwise required in D7.3 or elsewhere in the Contract, shall be sent to the attention of the Contract Administrator identified in D5.1.
- D7.3 All notices, requests, nominations, proposals, consents, approvals, statements, authorizations, documents, or other communications required to be submitted or returned to the City Solicitor shall be sent to the following facsimile number:
The City of Winnipeg
Legal Services Department
Attn: Director of Legal Services
Facsimile No.: 204 947-9155

D8. FURNISHING OF DOCUMENTS

- D8.1 Upon award of the Contract, the Contractor will be provided with ‘issued for construction’ Contract Documents electronically, including Drawings in PDF format only.

SUBMISSIONS

D9. AUTHORITY TO CARRY ON BUSINESS

- D9.1 The Contractor shall be in good standing under The Corporations Act (Manitoba), or properly registered under The Business Names Registration Act (Manitoba), or otherwise properly registered, licensed, or permitted by law to carry on business in Manitoba, or if the Contractor does not carry on business in Manitoba, in the jurisdiction where the Contractor does carry on business, throughout the term of the Contract, and shall provide the Contract Administrator with evidence thereof upon request.

D10. SAFE WORK PLAN

- D10.1 The Contractor shall attend a general Site awareness orientation at a designated City facility prior to developing their Safe Work Plan. The orientation will be approximately one (1) hour in length and will include an overview of the facilities where Work will occur, potential hazards present, warning systems, and site muster points. The Contractor shall ensure that all people performing Work at Site are aware of the requirements of the general site awareness orientation and the requirements are incorporated into their Safe Work Plan.
- D10.2 The Contractor shall provide the Contract Administrator with a Safe Work Plan at least five (5) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Document, if applicable.
- D10.3 The Safe Work Plan should be prepared and Submitted in the format shown in the City's template which is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Safety/default.stm>
- D10.4 Notwithstanding B13.5 at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated COR™ certificate or annual letter of good standing. A Contractor, who fails to provide a satisfactory COR™ certificate or annual letter of good standing, will not be permitted to continue to perform any Work.
- D10.5 The Contractor's Safe Work Plan shall include provisions to address the Federal, Provincial, and City health orders, recommendations, and guidelines, in effect at the time of the Work, related to COVID-19. The City reserves the right to impose restrictions on the Contractor beyond those included in applicable health orders, recommendations, and guidelines in effect at the time of the Work to mitigate any potential risks due to COVID-19 on City employees or facilities as necessary in accordance with D20.

D11. INSURANCE

- D11.1 The City shall provide and maintain the following owner controlled project insurance coverage to remain in place at all times during the performance of the Work and throughout the warranty period unless otherwise stated below:
- (a) wrap-up liability insurance in an amount of no less than ten million dollars (\$10,000,000) inclusive per occurrence and ten million dollars (\$10,000,000) general aggregate, covering bodily injury, personal injury, damage to the existing structure as required, property damage and products, and completed operations consistent with industry standard insurance policy wordings. Wrap-up liability insurance to also include evidence of contractual liability and cross liability clauses:
 - (i) The Contractor shall be responsible for deductibles up to fifty thousand dollars (\$50,000) maximum of any one loss;
 - (ii) The City will carry such insurance to cover the City, Contractor, Subcontractor, consultants, and sub-consultants as insured's. Provision of this insurance by the City is not intended in any way to relieve the Contractor from his/her obligations under the terms of the Contract. Specifically, losses relating to deductibles for insurance, as well as losses in excess of limits of coverage and any risk of loss that is not covered under the terms of the insurance provided by the City remains with the Contractor;
 - (iii) Wrap-up liability insurance shall be maintained from the date of the commencement of the Work until the date of Total Performance of the Work and shall include an additional twenty-four (24) months completed operations coverage which will take affect after Total Performance;
 - (b) all risks course of construction insurance including testing and commissioning in the amount of one hundred percent (100%) of the total Contract Price, Such policy shall be written in the name of the Contractor and the City. The Contractor shall be responsible for deductibles up to two hundred and fifty thousand dollars (\$250,000) maximum and one

hundred thousand (\$100,000) minimum of any one loss. Coverage will extend for at least ten (10) Calendar Days after Substantial Performance and if all testing and commissioning has not been completed at that time, the policy will extend until such time as all testing and commissioning has been completed.

D11.2 The Contractor shall provide and maintain the following insurance coverage:

- (a) commercial general liability insurance, in the amount of at least five million dollars (\$5,000,000) inclusive, with the City added as an additional insured, with a cross-liability clause, such liability policy to also contain contractual liability, non-owned automobile liability, and products and completed operations;
- (b) if applicable, automobile liability insurance covering all motor vehicles, owned and operated and used or to be used by the Contractor directly or indirectly in the performance of the Work. The limit of liability shall not be less than two million dollars (\$2,000,000) inclusive for loss or damage including personal injuries and death resulting from any one accident or occurrence;
- (c) Contractors pollution liability in the amount of at least one million dollars (\$1,000,000) inclusive per occurrence insuring against claims of third party-injury and property damage, including clean-up costs and transported cargo as a result of pollution conditions arising suddenly or gradually from the Contractor operations and completed operations;
- (d) property in transit insurance for the full value of machinery, equipment, and supplies while being transported via the Contractors' or the City's hi-rail vehicle and/or rail car on the GWWD Railway at all times during the performance of the Work; and
- (e) signed waivers of liability and assumption of risk agreements prior to the transporting of any supplies, equipment, machinery, materials, and/or personnel by the Contractor or the City. The GWWD Railway waiver forms are included in Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information).

D11.3 Deductibles shall be borne by the Contractor.

D11.4 The Contractor will be required to cooperate with the City and to provide their project experience and project claims history and any other information necessary to obtain the owner controlled project insurance as outlined in D11.1 within three (3) Business Days after notice of award.

D11.5 The Contractor shall provide the City Solicitor with a certificate(s) of insurance, in a form satisfactory to the City Solicitor, at least two (2) Business Days prior to the commencement of any Work but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D11.6 The Contractor shall not cancel, materially alter, or cause each policy to lapse without providing at least thirty (30) Calendar Days prior written notice to the Contract Administrator.

D11.7 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D12. CONTRACT SECURITY

D12.1 The Contractor shall provide and maintain the performance bond and the labour and material payment bond until the expiration of the warranty period in the form of:

- (a) a performance bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H1: Performance Bond), in the amount of fifty percent (50%) of the Contract Price; and
- (b) a labour and material payment bond of a company registered to conduct the business of a surety in Manitoba, in the form attached to these Supplemental Conditions (Form H2: Labour and Material Payment Bond), in an amount equal to fifty percent (50%) of the Contract Price.

D12.2 The Contractor shall provide the City Solicitor with the required performance and labour and material payment bonds within seven (7) Calendar Days of notification of the award of the Contract by way of an award letter prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D12.3 The Contractor shall, as soon as practicable after entering into a contract with a Subcontractor:

- (a) give the Subcontractor written notice of the existence of the labour and material payment bond in D12.1(b); and
- (b) post a notice of the bond and/or a copy of that bond in a conspicuous location at the Site of the Work.

D13. SUBCONTRACTOR LIST

D13.1 The Contractor shall provide the Contract Administrator with a complete list of the Subcontractors whom the Contractor proposes to engage (Form J: Subcontractor List) at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, if applicable.

D14. DETAILED WORK SCHEDULE

D14.1 The Contractor shall provide the Contract Administrator with a detailed work schedule at least two (2) Business Days prior to the commencement of any Work on the Site but in no event later than the date specified in C4.1 for the return of the executed Contract Documents, as applicable.

D14.2 The detailed work schedule shall consist of a "baseline schedule" component showing the planned start and completion dates for all activities/tasks. In addition, the detailed work schedule shall consist of an "update schedule" component showing the Contractor's updated planned or actual start, progress, and completion dates for each activity/task as construction proceeds in order to compare the Contractor's planned baseline schedule versus actual execution of the Work.

D14.3 The Contractor's planned baseline detailed work schedule will be reviewed by the Contract Administrator prior to commencement for conformance to the project intent and general conformance to the requirements of the Contract. The Contract Administrator's review does not relieve the Contractor of their responsibility to adhere to the requirements included in the Contract Documents.

D14.4 The Contractor shall not change the baseline portion of the detailed work schedule once it has been reviewed and accepted by the Contract Administrator without prior consent or until requested by the Contract Administrator.

D14.5 The detailed work schedule shall consist of the following:

- (a) a C.P.M. schedule for the Work;
- (b) a Gantt chart for the Work based on the C.P.M. schedule; and
- (c) capacity to show simultaneously the planned baseline schedule as well as the update schedule for each activity/task.

All shall be reviewed by, and shall be acceptable to the Contract Administrator. The Contractor shall make all requested changes to the documents as required by the Contract Administrator, and re-submit as needed prior to commencing the Work.

D14.6 Further to D14.5(a), the C.P.M. schedule shall clearly identify the start and completion dates of all of the following activities/tasks making up the Work, as well as showing those activities/tasks on the critical path, to provide sufficient detail of the critical events and their inter-relationship to demonstrate that the Work will be performed in conformity with D16, D17, D18, and E4.3.1:

- (a) for each facility, include:

- (i) programming and configuration;
 - (ii) FAT;
 - (iii) mobilization;
 - (iv) preparatory works;
 - (v) equipment installation;
 - (vi) equipment shutdown dates for any individual PLCs;
 - (vii) facility shutdown dates for any Station Master PLCs;
 - (viii) start-up and commissioning;
 - (ix) training;
 - (x) demolition;
 - (xi) facility closeout; and
 - (xii) demobilization;
- (b) critical stages;
 - (c) project closeout;
 - (d) Substantial Performance; and
 - (e) Total Performance.
- D14.7 Further to D14.5, the detailed work schedule shall directly incorporate the Submittal Schedule as set out in Section 01 33 00 – Submittal Procedures in the NMS or accompany the detailed work schedule as a paired document. For reference, it is anticipated that, at a minimum, the Submittal Schedule would include the Submittals as summarized in Appendix B – Submittal List.
- D14.8 Further to D14.5(b), the Gantt chart shall show the time on a weekly basis, required to carry out the Work of each trade or Specification division. The time shall be on the horizontal axis and the type of trade shall be on the vertical axis.
- D14.9 Without changing the baseline portion of the detailed work schedule, the Contractor shall accurately update and submit to the Contract Administrator the “update schedule” as an attachment to the weekly detailed Work Plan in accordance with E6.2(b). If the Submittal Schedule is not directly incorporated in the detailed work schedule, the updated Submittal Schedule shall accompany the updated detailed work schedule as a paired document.
- D14.10 The Contractor shall monitor the progress of the Work relative to the baseline detailed work schedule. Should the Contractor’s operations fall behind the accepted detailed work schedule, the Contractor shall, at no change in Contract Price, take corrective action to get back on schedule.

SCHEDULE OF WORK

D15. COMMENCEMENT

- D15.1 The Contractor shall not commence any Work until he/she is in receipt of an award letter from the Award Authority authorizing the commencement of the Work.
- D15.2 The Contractor shall not commence any Work on the Site until:
- (a) the Contract Administrator has confirmed receipt and approval of:
 - (i) evidence of authority to carry on business specified in D9;
 - (ii) evidence of the workers compensation coverage specified in C6.17;
 - (iii) the Safe Work Plan specified in D10;
 - (iv) evidence of the insurance specified in D11;
 - (v) the contract security specified in D12;
 - (vi) the Subcontractor list specified in D13;
 - (vii) the detailed work schedule specified in D14;

- (viii) the Submittal Schedule specified in Section 01 33 00 – Submittal Procedures in the NMS; and
 - (ix) evidence of security clearances for all staff and Subcontractors on Site specified in PART F - Security Clearance.
- (b) the Contractor has attended a pre-construction meeting with the Contract Administrator, or the Contract Administrator has waived the requirement for a pre-construction meeting.

D15.3 The City intends to award this Contract by January 15, 2021.

D15.3.1 If the actual date of award is later than the intended date, the dates specified for critical stages, Substantial Performance, and Total Performance will be adjusted by the difference between the aforementioned intended and actual dates.

D16. CRITICAL STAGES

D16.1 The Contractor shall achieve critical stages of the Work in accordance with the following requirements:

D16.1.1 Work Duration:

- (a) duration of Work for RDS/WTP SCADA integration in accordance with E5.3.1(a);
- (b) duration of Work at TBPS in accordance with E5.3.1(b);
- (c) duration of Work at SLAIF in accordance with E5.3.1(c);
- (d) duration of Work at McPhillips RPS in accordance with E5.3.1(d);
- (e) duration of Work at MacLean RPS in accordance with E5.3.1(e);
- (f) duration of Work at Hurst RPS in accordance with E5.3.1(f); and
- (g) duration of Work at DBPS and DCFF in accordance with E5.3.1(g);

D16.1.2 TBPS:

- (a) duration the surge tower is off-line with alternative level monitoring in accordance with E5.5.1; and
- (b) duration of alternative level monitoring in accordance with E5.5.2;

D16.1.3 SLAIF:

- (a) commissioning completion duration of any of the PLC system in accordance with E5.6.2;

D16.1.4 McPhillips RPS, MacLean RPS, and Hurst RPS:

- (a) commissioning completion duration of any of the pump PLCs in accordance with E5.7.1;
- (b) Station Master PLC hardware and programming installation duration in accordance with E5.7.3(b); and
- (c) Station Master PLC commissioning completion duration in accordance with E5.7.3(c);

D16.1.5 DBPS and DCFF:

- (a) commissioning completion duration of any of the pump PLCs in accordance with E5.8.1;
- (b) Station Master PLC hardware and programming installation duration in accordance with E5.8.3(b); and
- (c) Station Master PLC commissioning completion duration in accordance with E5.8.3(c).

D17. SUBSTANTIAL PERFORMANCE

D17.1 The Contractor shall achieve Substantial Performance by April 15, 2024.

- D17.2 When the Contractor considers the Work to be substantially performed, the Contractor shall arrange, attend, and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Substantial Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D17.3 The date on which the Work has been certified by the Contract Administrator as being substantially performed to the requirements of the Contract through the issue of a certificate of Substantial Performance is the date on which Substantial Performance has been achieved.

D18. TOTAL PERFORMANCE

- D18.1 The Contractor shall achieve Total Performance by July 1, 2024.
- D18.2 When the Contractor or the Contract Administrator considers the Work to be totally performed, the Contractor shall arrange, attend, and assist in the inspection of the Work with the Contract Administrator for purposes of verifying Total Performance. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that the Work can be re-inspected.
- D18.3 The date on which the Work has been certified by the Contract Administrator as being totally performed to the requirements of the Contract through the issue of a certificate of Total Performance is the date on which Total Performance has been achieved.

D19. LIQUIDATED DAMAGES

- D19.1 If the Contractor fails to achieve critical stages, Substantial Performance, or Total Performance in accordance with the Contract by the period fixed herein for same, the Contractor shall pay the City the following amounts per identified period following the period fixed herein for same during which such failure continues:
- D19.1.1 Work Duration
- (a) RDS/WTP SCADA integration Work duration critical stage listed in D16.1.1(a) – seven hundred fifty dollars (\$750) per Calendar Day;
 - (b) TBPS Work duration critical stage listed in D16.1.1(b) – seven hundred fifty dollars (\$750) per Calendar Day;
 - (c) SLAIF Work duration critical stage listed in D16.1.1(c) – one thousand five hundred dollars (\$1,500) per Calendar Day;
 - (d) McPhillips RPS Work duration critical Stage listed in D16.1.1(d) – seven hundred fifty dollars (\$750) per Calendar Day;
 - (e) MacLean RPS Work duration critical stage listed in D16.1.1(e) – seven hundred fifty dollars (\$750) per Calendar Day;
 - (f) Hurst RPS Work duration critical stage listed in D16.1.1(f) – seven hundred fifty dollars (\$750) per Calendar Day; and
 - (g) DBPS and DCFE Work duration critical stage listed in D16.1.1(g) – seven hundred fifty dollars (\$750) per Calendar Day.
- D19.1.2 TBPS
- (a) surge tower off-line without alternative level monitoring critical stage listed in D16.1.2(a) – two hundred fifty dollars (\$250) per Calendar Day; and
 - (b) surge tower alternative level monitoring duration critical stage listed in D16.1.2(b) – two hundred fifty dollars (\$250) per Calendar Day.

- D19.1.3 SLAIF
- (a) any PLC commissioning duration critical stage listed in D16.1.3(a) – two hundred fifty dollars (\$250) per Calendar Day.
- D19.1.4 McPhillips RPS, MacLean RPS, and Hurst RPS
- (a) pump PLC commissioning duration critical stage listed in D16.1.4(a) – five hundred dollars (\$500) per Calendar Day;
 - (b) Station Master PLC hardware and programming installation duration critical stage listed in D16.1.4(b) – one hundred seventy-five dollars (\$175) per hour; and
 - (c) Station Master PLC commissioning duration critical stage listed in D16.1.4(c) – one hundred seventy-five dollars (\$175) per hour.
- D19.1.5 DBPS and DCFF
- (a) pump PLC commissioning duration critical stage listed in D16.1.5(a) five hundred dollars (\$500) per Calendar Day;
 - (b) Station Master PLC hardware and programming installation duration critical stage listed in D16.1.5(b) – two thousand five hundred dollars (\$2,500) per hour for the first four (4) hours and ten thousand dollars (\$10,000) per hour thereafter; and
 - (c) Station Master Station commissioning duration critical stage listed in D16.1.5(c) – one hundred seventy-five dollars (\$175) per hour.
- D19.1.6 Substantial Performance
- (a) Substantial Performance – one thousand dollars (\$1,000) per Calendar Day.
- D19.1.7 Total Performance
- (a) Total Performance – five hundred dollars (\$500) per Calendar Day.
- D19.2 Concurrent liquidated damages will be not be assessed. In the case of concurrent liquidated damages, the greater value will govern.
- D19.3 The amounts specified for liquidated damages in D19.1 are based on a genuine pre-estimate of the City's losses in the event that the Contractor does not achieve critical stages, Substantial Performance, or Total Performance by the period fixed herein for same.
- D19.4 The City may reduce any payment to the Contractor by the amount of any liquidated damages assessed.
- D20. COVID-19 SCHEDULE DELAYS**
- D20.1 The City acknowledges that the schedule for this Contract may be impacted by the COVID-19 pandemic. Commencement and progress of the Work shall be performed by the Contractor with due consideration to the health and safety of workers and the public and directives from health authorities and various levels of government, and in close consultation with the Contract Administrator.
- D20.2 If the Contractor is delayed in the performance of the Work by reason of the COVID-19 pandemic, the Work schedule may be adjusted by a period of time equal to the time lost due to such delay and costs related to such delay will be determined as identified herein.
- D20.3 A minimum of seven (7) Calendar Days prior to the commencement of Work, the Contractor shall declare whether COVID-19 will affect the start date. If the Contractor declares that COVID-19 will affect the start date, the Contractor shall provide sufficient evidence that the delay is directly related to COVID-19, including but not limited to evidence related to availability of staff, availability of Material, or work by others.

- D20.4 For any delay related to COVID-19 and identified after Work has commenced, the Contractor shall within seven (7) Calendar Days of becoming aware of the anticipated delay declare the additional delay and shall provide sufficient evidence as indicated in D20.3. Failure to provide this notice will result in no additional time delays being considered by the City.
- D20.5 The Work schedule, pursuant to D14, including the durations identified in D16 to D18 where applicable, will be adjusted to reflect delays accepted by the Contract Administrator. No additional payment will be made for adjustment of schedules except where seasonal work, not previously identified in the Contract, is carried over to the following construction season.
- D20.6 Where Work not previously identified is being carried over solely as a result of delays related to COVID-19, as confirmed by the Contract Administrator, the cost of temporary works to maintain the Work in a safe manner until Work recommences, will be considered by the Contract Administrator. Where the Work is carried over only partially due to COVID-19, a partial consideration of the cost of temporary works will be considered by the Contract Administrator.
- D20.7 Any time or cost implications as a result of COVID-19 and in accordance with the above, as confirmed by the Contract Administrator, shall be documented in accordance with C7.

D21. WORK BY OTHERS

- D21.1 The following projects, to be undertaken by others, have the potential to affect the Work of this Contract. The construction timing and information provided below is considered preliminary and subject to change.
- (a) RPS Chlorination Upgrades:
 - (i) construction is planned for 2023 and 2024 at the Hurst RPS, MacLean RPS, and McPhillips RPS; and
 - (ii) construction may affect shutdown planning for the Work of this Contract.
 - (b) RPS Natural Gas Engine Cooling Upgrades:
 - (i) construction is planned for 2022 and 2023 at the MacLean RPS and McPhillips RPS;
 - (ii) construction may affect:
 - (i) which local control panels/pumps at the MacLean RPS and McPhillips RPS are available for the Work of this Contract; and
 - (ii) shutdown planning for the Work of this Contract.
 - (c) Reservoir Inspections at RPS:
 - (i) inspections are planned for 2021 and 2022 at Hurst RPS, MacLean RPS, and McPhillips RPS; and
 - (ii) inspections may affect shutdown planning for the Work of this Contract.
 - (d) DBPS Suction Header Divider Wall and Valve:
 - (i) construction is planned for 2024; and
 - (ii) construction may affect shutdown planning for the Work of this Contract.
- D21.2 The City will provide updated schedules for work by others undertaken at each facility, including any other work by others not identified above.
- D21.3 For clarity, the City intends to work collaboratively with the Contractor and the work being undertaken by others to minimize the potential impacts to the Work. The restrictions set out in E4.3.1, including the order of construction, were developed to provide the Contractor as much flexibility as possible.
- D21.4 The Contractor shall coordinate access to facilities, laydown areas, and shutdown requirements as they relate to work by others undertaken at each facility so as not to hinder, delay, or interfere with those projects and/or City forces in the performance of their work.

- D21.5 Any delays or extra work and the costs associated relating to the coordination of the Work shall be assessed by the Contract Administrator.
- D21.6 The City reserves the right to refuse a requested shutdown based on the availability of City resources or system status. Extension of critical stages as a result of shutdown requests being denied shall be assessed on a case-by-case basis.

CONTROL OF WORK

D22. JOB MEETINGS

- D22.1 Regular bi-weekly job meetings will be held for the duration of the Work. The job meetings are anticipated to occur at the Contract Administrator's office (1558 Willson Place) but may be changed if agreed to by the City, Contract Administrator, and the Contractor. These meetings shall be attended by a minimum of one (1) representative of the Contract Administrator, one (1) representative of the City, and one (1) representative of the Contractor. Each representative shall be a responsible person capable of expressing the position of the Contract Administrator, the City, and the Contractor respectively on any matter discussed at the meeting including the Work schedule and the need to make any revisions to the Work schedule. The progress of the Work will be reviewed at each of these meetings.
- D22.2 The Contract Administrator reserves the right to cancel any job meeting or call additional job meetings whenever he/she deems it necessary.
- D22.3 The Contract Administrator will record and distribute meeting minutes to the Contractor and City.

D23. PRIME CONTRACTOR – THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA)

- D23.1 Further to C6.26, the Contractor shall be the Prime Contractor and shall serve as, and have the duties of the Prime Contractor in accordance with The Workplace Safety and Health Act (Manitoba).

D24. THE WORKPLACE SAFETY AND HEALTH ACT (MANITOBA) – QUALIFICATIONS

- D24.1 Further to B13.5, the Contractor/Subcontractor must, throughout the term of the Contract, have a Workplace Safety and Health Program meeting the requirements of The Workplace Safety and Health Act (Manitoba). At any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require updated proof of compliance, as set out in B13.5.

D25. INTELLECTUAL PROPERTY AND OWNERSHIP OF INFORMATION

- D25.1 All reports, drawings, calculations, designs, plans, leading practices, specifications, PLC programming, SCADA system programming, and other data, information and all material utilized, collected, compiled, drawn and produced (including digital files) to carry out the Work contemplated in this Contract (collectively "Submittals") are solely the property of the City, with the exception of the materials and information in the possession of the Contractor prior to the commencement of the Work, and the Contractor's copyright in such property, if any, is hereby assigned to the City.
- D25.1.1 For greater clarity, any disclaimer that is included in or on any Submittals to limit the use by the City of such Submittal, as provided for under this Contract, shall have no force and effect and will not alter the terms of this Contract, unless the terms of that disclaimer are expressly agreed to by both parties in writing as an amendment to this Contract.
- D25.2 Without prejudice to any rights which may exist in the City by virtue of any prerogative rights and powers or by virtue of the Copyright Act of Canada, as amended from time to time, the Contractor assigns all present and future rights in the copyright in the Submittals absolutely and immediately to the City. Furthermore, the City or any third party granted a right through the City,

may use the Submittals or any part thereof for, or apply it to, other studies or projects without the Contractor's consent and without any payment or compensation whatsoever. If the City or any third party granted a right through the City elects to so use or apply the Submittals to another project, it does so at its own risk and the Contractor shall not be liable in any way for such other use or application or any adverse consequences flowing therefrom.

- D25.3 The Contractor expressly waives any claim to moral rights, as provided for in the law of copyright, over the Submittals or any part thereof, created by the Contractor, and the Contractor shall ensure that any agent or employee of the Contractor shall have waived all moral rights, as provided for in the law of copyright, over the Submittals or any part thereof.
- D25.4 All concepts, products, or processes produced by or resulting from the performance of the Work by the Contractor, or which are otherwise developed or first reduced to practise by the Contractor in the performance of the Work, and which are patentable, capable of trademark or otherwise, shall be the property of the City.
- D25.5 The Contractor shall have a permanent, non-exclusive, royalty-free licence to use any concept, product, or process, which is patentable, capable of trademark, or otherwise, produced by, or resulting from the performance of the Work by the Contractor, for the duration of the Work, and for no other purpose or project.
- D25.6 The Contractor shall not infringe any copyright, trademark, patent, industrial design, trade secret, moral, or other proprietary right of a third party and shall indemnify the City from all claims arising out of such an infringement.
- D25.7 If the City or the Contractor is served with a claim or notice of an infringement or alleged infringement of any patent, copyright, trademark or trade name, the party so served shall immediately give notice thereof to the other party.
- D25.8 The Contractor shall assist the City in every reasonable way to secure, maintain, and defend for the City's benefit all copyrights, patent rights, trade secret rights, and other proprietary rights in and to the Submittals.
- D25.9 If the City or the Contractor is prevented by injunction from using any design, device, material, or process covered by letters patent, copyright, trademark, or trade name, the Contractor shall, at its own cost, substitute an equally suitable design, device, material, or process, all subject to the prior approval of the Contract Administrator.
- D25.10 The Contractor shall provide all Submittals in a format that allows the City to readily use those Submittals. Requirements related to the submission of Submittals are set out in Section 01 33 00 – Submittal Procedures in the NMS.
- D25.10.1 For greater clarity, the use of proprietary software or programming languages will not be permitted.

D26. REQUEST FOR INFORMATION

- D26.1 Requests for information regarding the Work or Contract Documents shall be in accordance with Section 01 33 00 – Submittal Procedures in the NMS.
- D26.1.1 For clarity, the requests for information noted here are for during construction (i.e. following award of the Contract). Any enquiries from Bidders shall be in accordance with B4.

MEASUREMENT AND PAYMENT

D27. PAYMENT

- D27.1 Further to C12, the City may at its option pay the Contractor by direct deposit to the Contractor's banking institution.

WARRANTY

D28. WARRANTY

D28.1 Notwithstanding C13.2, the warranty period shall begin on the date of Total Performance and shall expire one (1) year thereafter unless extended pursuant to C13.2.1 or C13.2.2, in which case it shall expire when provided for thereunder.

THIRD PARTY AGREEMENTS

D29. FUNDING AND/OR CONTRIBUTION AGREEMENT OBLIGATIONS

D29.1 In the event that funding for the Work of the Contract is provided to the City of Winnipeg by the Government of Manitoba and/or the Government of Canada, the following terms and conditions shall apply, as required by the applicable funding agreements.

D29.2 Further to D29.1, in the event that the obligations in D29 apply, actual costs legitimately incurred by the Contractor as a direct result of these obligations ("funding costs") shall be determined by the actual cost to the Contractor and not by the valuation method(s) outlined in C7.4. In all other respects funding costs will be processed in accordance with Changes in Work under C7.

D29.3 For the purposes of D29:

- (a) "**Government of Canada**" includes the authorized officials, auditors, and representatives of the Government of Canada; and,
- (b) "**Government of Manitoba**" includes the authorized officials, auditors, and representatives of the Government of Manitoba.

D29.4 Modified Insurance Requirements

D29.4.1 If not already required under the insurance requirements identified in D11, the Contractor will be required to provide wrap-up liability insurance in an amount of no less than two million dollars (\$2,000,000) inclusive per occurrence. Such policy will be written in the joint names of the City, Contractor, Consultants and all Subcontractors, and subconsultants and include twelve (12) months completed operations. The Government of Manitoba and its Ministers, officers, employees, and agents shall be added as additional insureds.

D29.4.2 If not already required under the insurance requirements identified in D11, the Contractor will be required to provide builders' risk insurance (including boiler and machinery insurance, as applicable) providing all risks coverage at full replacement cost, or such lower level of insurance that the City may identify on a case-by-case basis, such as an installation floater.

D29.4.3 The Contractor shall obtain and maintain third party liability insurance with minimum coverage of two million dollars (\$2,000,000) per occurrence on all licensed vehicles operated at the Site. In the event that this requirement conflicts with another licensed vehicle insurance requirement in this Contract, then the requirement that provides the higher level of insurance shall apply.

D29.4.4 Further to D11.5, insurers shall provide satisfactory certificates of insurance to the Government of Manitoba prior to commencement of Work as written evidence of the insurance required. The certificates of insurance must provide for a minimum of thirty (30) days' prior written notice to the Government of Manitoba in case of insurance cancellation.

D29.4.5 All policies must be taken out with insurers licensed to carry on business in the Province of Manitoba.

D29.5 Indemnification By Contractor

D29.5.1 In addition to the indemnity obligations outlined in C17 of the *General Conditions for Construction*, the Contractor agrees to indemnify and save harmless the Government of Canada and the Government of Manitoba and each of their respective Ministers, officers, servants, employees, and agents from and against all claims and demands, losses, costs, damages, actions, suit, or other proceedings brought or pursued in any manner in respect of any matter caused by the Contractor or arising from this Contract or the Work, or from the goods or services provided or required to be provided by the Contractor, except those resulting from the negligence of any of the Government of Canada's or the Government of Manitoba's Ministers, officers, servants, employees, or agents, as the case may be.

D29.6 Records Retention and Audits

D29.6.1 The Contractor shall maintain and preserve accurate and complete records in respect of this Contract and the Work, including all accounting records, financial documents, copies of contracts with other parties and other records relating to this Contract and the Work during the term of the Contract and for at least six (6) years after Total Performance. Those records bearing original signatures or professional seals or stamps must be preserved in paper form; other records may be retained in electronic form.

D29.6.2 In addition to the record keeping and inspection obligations outlined in C6 of the *General Conditions for Construction*, the Contractor shall keep available for inspection and audit at all reasonable times while this Contract is in effect and until at least six (6) years after Total Performance, all records, documents, and contracts referred to in D29.6.1 for inspection, copying, and audit by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to produce them on demand; to provide reasonable facilities for such inspections, copying and audits, to provide copies of and extracts from such records, documents, or contracts upon request by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada and their respective representatives and auditors, and to promptly provide such other information and explanations as may be reasonably requested by the City of Winnipeg, the Government of Manitoba, and/or the Government of Canada from time-to-time.

D29.7 Other Obligations

D29.7.1 The Contractor consents to the City providing a copy of the Contract Documents to the Government of Manitoba and/or the Government of Canada upon request from either entity.

D29.7.2 If the Lobbyists Registration Act (Manitoba) applies to the Contractor, the Contractor represents and warrants that it has filed a return and is registered and in full compliance with the obligations of that Act, and covenants that it will continue to comply for the duration of this Contract.

D29.7.3 The Contractor shall comply with all applicable legislation and standards, whether federal, provincial, or municipal, including (without limitation) labour, environmental, and human rights laws, in the course of providing the Work.

D29.7.4 The Contractor shall properly account for the Work provided under this Contract and payment received in this respect, prepared in accordance with generally accepted accounting principles in effect in Canada, including those principles and standards approved or recommended from time-to-time by the Chartered Professional Accountants of Canada or the Public Sector Accounting Board, as applicable, applied on a consistent basis.

FORM H1: PERFORMANCE BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

_____ ,
(hereinafter called the "Principal"), and

_____ ,
(hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), in the sum of

_____ dollars (\$_____.)

of lawful money of Canada to be paid to the Obligee, or its successors or assigns, for the payment of which sum the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

TENDER NO. 805-2019

RDS SCADA SYSTEM UPGRADE, PLC REPLACEMENT, AND POWER RELIABILITY UPGRADES

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall:

- (a) carry out and perform the Contract and every part thereof in the manner and within the times set forth in the Contract and in accordance with the terms and conditions specified in the Contract;
- (b) perform the Work in a good, proper, workmanlike manner;
- (c) make all the payments whether to the Obligee or to others as therein provided;
- (d) in every other respect comply with the conditions and perform the covenants contained in the Contract; and
- (e) indemnify and save harmless the Obligee against and from all loss, costs, damages, claims, and demands of every description as set forth in the Contract, and from all penalties, assessments, claims, actions for loss, damages or compensation whether arising under "The Workers Compensation Act", or any other Act or otherwise arising out of or in any way connected with the performance or non-performance of the Contract or any part thereof during the term of the Contract and the warranty period provided for therein;

THEN THIS OBLIGATION SHALL BE VOID, but otherwise shall remain in full force and effect. The Surety shall not, however, be liable for a greater sum than the sum specified above.

AND IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable as Principal, and that nothing of any kind or matter whatsoever that will not discharge the Principal shall operate as a discharge or release of liability of the Surety, any law or usage relating to the liability of Sureties to the contrary notwithstanding.

IN WITNESS WHEREOF the Principal and Surety have signed and sealed this bond the

_____ day of _____, 20____.

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

FORM H2: LABOUR AND MATERIAL PAYMENT BOND
(See D12)

KNOW ALL MEN BY THESE PRESENTS THAT

his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Principal"), and

_____,
his/its heirs, executors, administrators, successors or assigns (hereinafter called the "Surety"), are held and firmly bound unto **THE CITY OF WINNIPEG** (hereinafter called the "Obligee"), for the use and benefit of claimants as herein below defined, in the amount of

_____ dollars (\$_____)

of lawful money of Canada, for the payment whereof we, the Principal and the Surety jointly and severally bind ourselves firmly by these presents.

WHEREAS the Principal has entered into a written contract with the Obligee for

TENDER NO. 805-2019

RDS SCADA SYSTEM UPGRADE, PLC REPLACEMENT, AND POWER RELIABILITY UPGRADES

which is by reference made part hereof and is hereinafter referred to as the "Contract".

NOW THEREFORE the condition of the above obligation is such that if the Principal shall promptly make payment to all claimants as hereinafter defined, for all labour, service and material used or reasonably required for use in the performance of the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect subject, however, to the following conditions:

- (a) A claimant is defined as one having a direct contract with the Principal for labour, service and material, or any of them, used or reasonably required for use in the performance of the contract, labour, service and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment (but excluding rent of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract;
- (b) The above-named Principal and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work, labour or service was done or performed, or materials were furnished by such claimant, may sue on this bond, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon;
- (c) No suit or action shall be commenced hereunder by any claimant
 - (i) unless claimant shall have given written notice to the Principal and the Surety above-named, within one hundred and twenty (120) days after such claimant did or performed the last of the work, labour or service, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work, labour or service was done or performed. Such notice shall be served by mailing the same by registered mail to the Principal, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the Province of Manitoba;

- (ii) after the expiration of one (1) year following the date on which Principal ceased work on said Contract; including work performed under the guarantees provided in the Contract;
 - (iii) other than in a court of competent jurisdiction in the Province of Manitoba.
- (d) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.
- (e) The Surety shall not be liable for a greater sum than the specified penalty of this bond.

The Principal and Surety hereby agree that The Guarantors' Liability Act (Manitoba) shall apply to this Bond.

IN TESTIMONY WHEREOF, the Principal has hereunto set its hand affixed its seal, and the Surety has caused these presents to be sealed and with its corporate seal duly attested by the authorized signature of its signing authority this

_____ day of _____, 20_____ .

SIGNED AND SEALED
in the presence of:

(Witness as to Principal if no seal)

(Name of Principal)

Per: _____ (Seal)

Per: _____

(Name of Surety)

By: _____ (Seal)
(Attorney-in-Fact)

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS AND DRAWINGS

- E1.1 These Specifications shall apply to the Work.
- E1.2 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.2.1 *The City of Winnipeg Standard Construction Specifications* is available on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division website at <http://www.winnipeg.ca/matmgt/Spec/Default.stm>
- E1.2.2 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.2.3 Further to C2.4(d), Specifications included in the Tender shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.3 Bidders are reminded that requests for approval of substitutes as an approved equal or an approved alternative shall be made in accordance with B7. In every instance where a brand name or design specification is used, the City will also consider approved equals and/or approved alternatives in accordance with B7.
- E1.4 The following appendices are applicable to the Work:
- (a) Appendix A – Major Equipment List
 - (b) Appendix B – Submittal List
 - (c) Appendix C – Process Control Narrative
 - (d) Appendix D – PLC Wiring Schematics and Loop Drawings (Existing)
 - (e) Appendix E – Process and Instrumentation Diagram Drawings (Existing)
 - (f) Appendix F – PLC Configuration, I/O List and Program Logic (Existing)
 - (g) Appendix G – Unity Pro Function Blocks (Existing)
 - (h) Appendix H – System Platform Objects (Existing)
 - (i) Appendix I – Telvent Screens (Existing)
 - (j) Appendix J – Asbestos Reports
 - (k) Appendix K – Regional Water Supply SCADA System Station & Pump PLC Manual (Existing)
 - (l) Appendix L – Water Treatment Plant User Requirement Specification (Existing)
 - (m) Appendix M – Sequential Function Chart Drawings (Existing)
 - (n) Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information)
 - (o) Appendix O – Sample Non-Disclosure Agreement
 - (p) Appendix P – Laydown Areas
 - (q) Appendix Q – Training Tables
- E1.4.1 Due to the sensitive nature of the information regarding critical City infrastructure, the following appendices are confidential:
- (a) Appendix C – Process Control Narrative
 - (b) Appendix D – PLC Wiring Schematics and Loop Drawings (Existing)
 - (c) Appendix E – Process and Instrumentation Diagram Drawings (Existing)

- (d) Appendix F – PLC Configuration, I/O List and Program Logic (Existing)
- (e) Appendix G – Unity Pro Function Blocks (Existing)
- (f) Appendix H – System Platform Objects (Existing)
- (g) Appendix I – Telvent Screens (Existing)
- (h) Appendix L – Water Treatment Plant User Requirement Specification (Existing)
- (i) Appendix M – Sequential Function Chart Drawings (Existing)

E1.4.2 Further to E1.4.1, in order to receive the document(s) included to these Appendices, a written request shall be submitted to the Contract Administrator. A signed non-disclosure Agreement form will be required prior to issuance of the document(s). A sample non-disclosure agreement has been included in Appendix O – Sample Non-Disclosure Agreement for reference. Upon receipt of the written request and signed non-disclosure agreement form, the requested document(s) will be provided.

E1.5 The following are applicable to the Work:

| <u>Specification No.</u> | <u>Specification Title</u> |
|--------------------------|--|
| | Table of Contents |
| DIVISION 01 – | GENERAL REQUIREMENTS |
| 01 33 00 | Submittal Procedures |
| 01 61 00 | Common Product Requirements |
| 01 73 00 | Execution |
| 01 74 00 | Cleaning |
| 01 78 00 | Closeout Submittals |
| DIVISION 02 – | EXISTING CONDITIONS |
| 02 82 00.01 | Asbestos Abatement - Minimum Precautions |
| 02 82 00.02 | Asbestos Abatement - Intermediate Precautions |
| DIVISION 07 – | THERMAL AND MOISTURE PROTECTION |
| 07 84 00 | Fire Stopping |
| DIVISION 09 – | FINISHES |
| 09 91 00.08 | Painting for Minor Works |
| DIVISION 26 – | ELECTRICAL |
| 26 05 00 | Common Work Results for Electrical |
| 26 05 05 | Selective Demolition for Electrical |
| 26 05 20 | Wire and Box Connectors (0-1000 V) |
| 26 05 21 | Wires and Cables (0-1000 V) |
| 26 05 28 | Grounding - Secondary |
| 26 05 29 | Hangars and Supports for Electrical Systems |
| 26 05 31 | Splitters, Junctions, Pull Boxes, and Cabinets |
| 26 05 32 | Outlet Boxes, Conduit Boxes, and Fittings |
| 26 05 34 | Conduits, Conduit Fastenings, and Conduit Fittings |
| 26 05 36 | Cable Trays for Electrical Systems |
| 26 05 43.01 | Installation of Cables in Trenches and in Ducts |
| 26 09 23.01 | Metering and Switchboard Instruments |
| 26 18 39.01 | Motor Controllers 2000 to 5000 V (Non-Hazardous) |
| 26 22 19 | Control and Signal Transformers |
| 26 24 17 | Panelboard Breaker Types |
| 26 27 26 | Wiring Devices |
| 26 28 21 | Moulded Case Circuit Breakers |
| 26 29 03 | Control Devices |

| | | |
|--------------------|----------|---|
| Division 29 | - | INSTRUMENTATION AND CONTROLS |
| 29 05 00 | | Common Work - Instrumentation and Control |
| 29 10 01 | | Enclosures |
| 29 15 01 | | Instrumentation Cable |
| 29 30 11 | | Miscellaneous Panel Devices |
| 29 30 21 | | Power Supplies |
| 29 40 01 | | Control and Operator Interface Requirements |
| 29 40 11 | | PLC I-O Index |
| 29 40 21 | | Instrument Index |
| 29 40 51 | | Programmable Logic Controllers |
| 29 40 52 | | PMCM Unit |
| 29 50 01 | | Instrumentation Specification Sheets |

| RDS/WTP SCADA Integration | | | |
|-------------------------------------|--------------|-----------------|--|
| Note: Drawing included in DBPS/DCFF | | | |
| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
| 1-0601U-A0054 | 001 | 0 | PRIMARY COMMUNICATION MODE INTERIM ARCHITECTURE CONTROL SYSTEM ARCHITECTURE |
| 1-0601U-A0055 | 001 | 0 | PRIMARY COMMUNICATION MODE FINAL ARCHITECTURE CONTROL SYSTEM ARCHITECTURE |
| 1-0601U-A0056 | 001 | 0 | SECONDARY COMMUNICATION MODE INTERIM ARCHITECTURE CONTROL SYSTEM ARCHITECTURE |
| 1-0601U-A0057 | 001 | 0 | SECONDARY COMMUNICATION MODE FINAL ARCHITECTURE CONTROL SYSTEM ARCHITECTURE |
| TBPS | | | |
| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
| 1-0660P-D0003 | 001 | 0 | COVER PAGE |
| 1-0660P-D0004 | 001 | 0 | INDEX PAGE |
| 1-0660P-A0021 | 001 | 0 | MAIN CONTROL PANEL (MCP) - DEMOLITION |
| 1-0660P-A0022 | 001 | 0 | MAIN CONTROL PANEL (MCP) - PANEL LAYOUT |
| 1-0660P-A0023 | 001 | 0 | MAIN CONTROL PANEL (MCP) - POWER DISTRIBUTION |
| 1-0660P-A0024 | 001 | 0 | STATION PLC - PLC-M800 - RACK LAYOUT |
| 1-0660P-A0025 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800 - RACK LAYOUT |
| 1-0660P-A0026 | 001 | 0 | LOCAL CONTROL PANEL - LCP-1 - DEMOLITION |
| 1-0660P-A0027 | 001 | 0 | LOCAL CONTROL PANEL - LCP-1 - PANEL LAYOUT |
| 1-0660P-A0028 | 001 | 0 | LOCAL CONTROL PANEL - LCP-1 - POWER DISTRIBUTION |
| 1-0660P-A0029 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - RACK LAYOUT |
| 1-0660P-A0030 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - POWER SUPPLY WIRING DIAGRAM |
| 1-0660P-A0031 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - SLOT 1 WIRING DIAGRAM |
| 1-0660P-A0032 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - RELAY CARD WIRING DIAGRAM |
| 1-0660P-A0033 | 001 | 0 | LOCAL CONTROL PANEL - LCP-2 - DEMOLITION |
| 1-0660P-A0034 | 001 | 0 | LOCAL CONTROL PANEL - LCP-2 - PANEL LAYOUT |
| 1-0660P-A0035 | 001 | 0 | LOCAL CONTROL PANEL - LCP-2 - POWER DISTRIBUTION |
| 1-0660P-A0036 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - RACK LAYOUT |
| 1-0660P-A0037 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - POWER SUPPLY WIRING DIAGRAM |
| 1-0660P-A0038 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 1 WIRING DIAGRAM |
| 1-0660P-A0039 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - RELAY CARD WIRING DIAGRAM |
| 1-0660P-A0040 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - DEMOLITION |
| 1-0660P-A0041 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - PANEL LAYOUT |

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|---------------|-----|---|--|
| 1-0660P-A0042 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - POWER DISTRIBUTION |
| 1-0660P-A0043 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - RACK LAYOUT |
| 1-0660P-A0044 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - POWER SUPPLY WIRING DIAGRAM |
| 1-0660P-A0045 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - SLOT 1 WIRING DIAGRAM |
| 1-0660P-A0046 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - RELAY CARD WIRING DIAGRAM |
| 1-0660P-A0047 | 001 | 0 | NETWORK ARCHITECTURE DIAGRAM |
| 1-0660P-E0001 | 001 | 0 | FLOOR PLAN - PUMP LEVEL |
| 1-0660P-E0002 | 001 | 0 | FLOOR PLAN - BASEMENT LEVEL |
| 1-0660M-P0004 | 001 | 1 | PROCESS & INSTRUMENTATION DIAGRAM MISCELLANEOUS |
| 1-0660P-A0048 | 001 | 0 | STATION FLOOD LOCKOUT 2 - LSH-M5900-2 |

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| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
|----------------|-------|----------|--|
| 1-0600U-D0001 | 001 | 0 | COVER PAGE |
| 1-0600U-D0002 | 001 | 0 | INDEX PAGE |
| 1-0600U-A0001 | 001 | 0 | MAIN ALARM PANEL - PL-15 - DEMOLITION |
| 1-0600U-A0002 | 001 | 0 | MAIN ALARM PANEL - PL-15 - PANEL LAYOUT |
| 1-0600U-A0003 | 001 | 0 | STATION PLC - PLC-P015 - RACK LAYOUT |
| 1-0600U-A0004 | 001 | 0 | REMOTE I/O (RIO) - RIO-P015 - RACK LAYOUT |
| 1-0600U-A0024 | 001 | 0 | PUMPROOM ALARM PANEL - PL-17 - DEMOLITION |
| 1-0600U-A0025 | 001 | 0 | PUMPROOM ALARM PANEL - PL-17 - PANEL LAYOUT |
| 1-0600U-A0026 | 001 | 0 | REMOTE I/O (RIO) - RIO-P017 - RACK LAYOUT |
| 1-0600U-A0042 | 001 | 0 | GENERATOR SET CONTROL PANEL - PL-30 - DEMOLITION |
| 1-0600U-A0043 | 001 | 0 | GENERATOR SET CONTROL PANEL - PL-30 - PANEL LAYOUT |
| 1-0600U-A0044 | 001 | 0 | REMOTE I/O (RIO) - RIO-P030 - RACK LAYOUT |
| 1-0600U-A0061 | 001 | 0 | ACID TRANSFER BUILDING ALARM PANEL - PL-40 - DEMOLITION |
| 1-0600U-A0062 | 001 | 0 | ACID TRANSFER BUILDING ALARM PANEL - PL-40 - PANEL LAYOUT |
| 1-0600U-A0063 | 001 | 0 | REMOTE I/O (RIO) - RIO-A040 - RACK LAYOUT |
| 1-0600U-A0066 | 001 | 0 | CHLORINE BUILDING ALARM PANEL - PL-41 - DEMOLITION |
| 1-0600U-A0067 | 001 | 0 | CHLORINE BUILDING ALARM PANEL - PL-41 - PANEL LAYOUT |
| 1-0600U-A0068 | 001 | 0 | REMOTE I/O (RIO) - RIO-C041 - RACK LAYOUT |
| 1-0600U-A0073 | 001 | 0 | DECHLORINATION BUILDING ALARM PANEL - PL-42 - DEMOLITION |
| 1-0600U-A0074 | 001 | 0 | DECHLORINATION BUILDING ALARM PANEL - PL-42 - PANEL LAYOUT |
| 1-0600U-A0075 | 001 | 0 | REMOTE I/O (RIO) - RIO-D042 - RACK LAYOUT |
| 1-0600U-A0079 | 001 | 0 | ATS-PL43 - PL-43 - DEMOLITION |
| 1-0600U-A0080 | 001 | 0 | ATS-PL43 - PL-43 - PANEL LAYOUT |
| 1-0600U-A0081 | 001 | 0 | REMOTE I/O (RIO) - RIO-P043-1 - RACK LAYOUT |
| 1-0600U-A0089 | 001 | 0 | ELECTRICAL ROOM ALARM PANEL - PL-43 - DEMOLITION |
| 1-0600U-A0090 | 001 | 0 | ELECTRICAL ROOM ALARM PANEL - PL-43 - PANEL LAYOUT |
| 1-0600U-A0091 | 001 | 0 | REMOTE I/O (RIO) - RIO-P043-2 - RACK LAYOUT |
| 1-0600U-A0098 | 001 | 0 | DOMESTIC WATER PUMP - MCC-A2 CELL 42 - DEMOLITION |
| 1-0600U-A0099 | 001 | 0 | DOMESTIC WATER PUMP - MCC-A2 CELL 42 - PANEL LAYOUT |
| 1-0600U-A0100 | 001 | 0 | REMOTE I/O (RIO) - RIO-P802 - RACK LAYOUT |
| 1-0600U-A0106 | 001 | 0 | LOW LIFT PUMP No.1 CONTROL PANEL - PL-57 - DEMOLITION |
| 1-0600U-A0107 | 001 | 0 | LOW LIFT PUMP No.1 CONTROL PANEL - PL-57 - PANEL LAYOUT |
| 1-0600U-A0108 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - RACK LAYOUT |
| 1-0600U-A0109 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - POWER SUPPLY WIRING DIAGRAM |
| 1-0600U-A0110 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 1 WIRING DIAGRAM |
| 1-0600U-A0111 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 2 WIRING DIAGRAM |

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| 1-0600U-A0112 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 3 WIRING DIAGRAM |
| 1-0600U-A0113 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 4 WIRING DIAGRAM |
| 1-0600U-A0114 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 5 WIRING DIAGRAM |
| 1-0600U-A0115 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 6 WIRING DIAGRAM |
| 1-0600U-A0116 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 7 WIRING DIAGRAM |
| 1-0600U-A0117 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 8 WIRING DIAGRAM |
| 1-0600U-A0118 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 9 WIRING DIAGRAM |
| 1-0600U-A0119 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - SLOT 10 WIRING DIAGRAM |
| 1-0600U-A0120 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P057 - RELAY CARD WIRING DIAGRAM |
| 1-0600U-A0121 | 001 | 0 | DIESEL DRIVEN PUMP#2 CONTROL PANEL - PL-59 - DEMOLITION |
| 1-0600U-A0122 | 001 | 0 | DIESEL DRIVEN PUMP#2 CONTROL PANEL - PL-59 - PANEL LAYOUT |
| 1-0600U-A0123 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P059 - RACK LAYOUT |
| 1-0600U-A0124 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P059 - POWER SUPPLY WIRING DIAGRAM |
| 1-0600U-A0125 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P059 - SLOT 1 WIRING DIAGRAM |
| 1-0600U-A0126 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P059 - SLOT 2 WIRING DIAGRAM |
| 1-0600U-A0127 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P059 - SLOT 3 WIRING DIAGRAM |
| 1-0600U-A0128 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-P059 - RELAY CARD WIRING DIAGRAM |
| 1-0600U-A0129 | 001 | 0 | NETWORK ARCHITECTURE DIAGRAM |
| 1-0600U-E0001 | 001 | 0 | OVERALL SITE LAYOUT |
| 1-0600U-E0002 | 001 | 0 | FLOOR PLAN - STAFFHOUSE |
| 1-0600U-E0003 | 001 | 0 | FLOOR PLAN - ELECTRICAL SHED |
| 1-0600U-E0004 | 001 | 0 | FLOOR PLAN - OPERATOR'S RESIDENCE |
| 1-0600U-E0005 | 001 | 0 | FLOOR PLAN - INTAKE BUILDING |
| 1-0600U-E0006 | 001 | 0 | FLOOR PLAN - ACID TRANSFER BUILDING |
| 1-0600U-E0007 | 001 | 0 | FLOOR PLAN - CHLORINE BUILDING |
| 1-0600U-E0008 | 001 | 0 | FLOOR PLAN - DECHLORINATION BUILDING |
| 1-0600U-E0009 | 001 | 0 | FLOOR PLAN - ENGINE SHED |
| 1-0600U-E0010 | 001 | 0 | FLOOR PLAN - LAKEVIEW RESIDENCE |
| 1-0600U-E0011 | 001 | 0 | FLOOR PLAN - FOREMAN'S RESIDENCE |

McPhillips RPS

| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
|----------------|-------|----------|--|
| 1-0640P-D0001 | 001 | 0 | COVER PAGE |
| 1-0640P-D0002 | 001 | 0 | INDEX PAGE 1 OF 2 |
| 1-0640P-D0002 | 002 | 0 | INDEX PAGE 2 OF 2 |
| 1-0640P-A0001 | 001 | 0 | MAIN CONTROL PANEL (MCP) - DEMOLITION |
| 1-0640P-A0002 | 001 | 0 | MAIN CONTROL PANEL (MCP) - PANEL LAYOUT |
| 1-0640P-A0003 | 001 | 0 | MAIN CONTROL PANEL (MCP) - POWER DISTRIBUTION |
| 1-0640P-A0004 | 001 | 0 | STATION PLC - PLC-M800 - RACK LAYOUT |
| 1-0640P-A0005 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800-A - RACK LAYOUT |
| 1-0640P-A0006 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800-D - RACK LAYOUT |
| 1-0640P-A0007 | 001 | 0 | LOCAL CONTROL PANEL - LCP-1 - DEMOLITION |
| 1-0640P-A0008 | 001 | 0 | LOCAL CONTROL PANEL - LCP-1 - PANEL LAYOUT |
| 1-0640P-A0009 | 001 | 0 | LOCAL CONTROL PANEL - LCP-1 - POWER DISTRIBUTION |
| 1-0640P-A0010 | 001 | 0 | PLC-M001 - RACK LAYOUT |
| 1-0640P-A0011 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - RACK LAYOUT |

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| 1-0640P-A0012 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - POWER SUPPLY WIRING DIAGRAM |
| 1-0640P-A0013 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - SLOT 1 WIRING DIAGRAM |
| 1-0640P-A0014 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - SLOT 2 WIRING DIAGRAM |
| 1-0640P-A0015 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - SLOT 3 WIRING DIAGRAM |
| 1-0640P-A0016 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - SLOT 4 WIRING DIAGRAM |
| 1-0640P-A0017 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - SLOT 5 WIRING DIAGRAM |
| 1-0640P-A0018 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M001 - RELAY CARD WIRING DIAGRAM |
| 1-0640P-A0019 | 001 | 0 | LOCAL CONTROL PANEL - LCP-2 - DEMOLITION |
| 1-0640P-A0020 | 001 | 0 | LOCAL CONTROL PANEL - LCP-2 - PANEL LAYOUT |
| 1-0640P-A0021 | 001 | 0 | LOCAL CONTROL PANEL - LCP-2 - POWER DISTRIBUTION |
| 1-0640P-A0022 | 001 | 0 | PLC-M002 - RACK LAYOUT |
| 1-0640P-A0023 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - RACK LAYOUT |
| 1-0640P-A0024 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - POWER SUPPLY WIRING DIAGRAM |
| 1-0640P-A0025 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 1 WIRING DIAGRAM |
| 1-0640P-A0026 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 2 WIRING DIAGRAM |
| 1-0640P-A0027 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 3 WIRING DIAGRAM |
| 1-0640P-A0028 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 4 WIRING DIAGRAM |
| 1-0640P-A0029 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 5 WIRING DIAGRAM |
| 1-0640P-A0030 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - SLOT 6 WIRING DIAGRAM |
| 1-0640P-A0031 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M002 - RELAY CARD WIRING DIAGRAM |
| 1-0640P-A0032 | 001 | 0 | SWITCHGEAR - SGR-M002 - DEMOLITION |
| 1-0640P-A0033 | 001 | 0 | SWITCHGEAR - SGR-M002 - PANEL LAYOUT |
| 1-0640P-E0001 | 001 | 0 | PUMP PP-2 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0640P-E0002 | 001 | 0 | PUMP PP-2 - MOTOR STARTER SCHEMATIC |
| 1-0640P-A0034 | 001 | 0 | PUMP PP-2 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0640P-A0034 | 002 | 0 | PUMP PP-2 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0640P-A0035 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - DEMOLITION |
| 1-0640P-A0036 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - PANEL LAYOUT |
| 1-0640P-A0037 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - POWER DISTRIBUTION |
| 1-0640P-A0038 | 001 | 0 | PLC-M003 - RACK LAYOUT |
| 1-0640P-A0039 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - RACK LAYOUT |
| 1-0640P-A0040 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - POWER SUPPLY WIRING DIAGRAM |
| 1-0640P-A0041 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - SLOT 1 WIRING DIAGRAM |
| 1-0640P-A0042 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - SLOT 2 WIRING DIAGRAM |
| 1-0640P-A0043 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - SLOT 3 WIRING DIAGRAM |
| 1-0640P-A0044 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - SLOT 4 WIRING DIAGRAM |
| 1-0640P-A0045 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M003 - RELAY CARD WIRING DIAGRAM |
| 1-0640P-A0046 | 001 | 0 | LOCAL CONTROL PANEL - LCP-4 - DEMOLITION |
| 1-0640P-A0047 | 001 | 0 | LOCAL CONTROL PANEL - LCP-4 - PANEL LAYOUT |

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| 1-0640P-A0048 | 001 | 0 | LOCAL CONTROL PANEL - LCP-4 - POWER DISTRIBUTION |
| 1-0640P-A0049 | 001 | 0 | PLC-M004 - RACK LAYOUT |
| 1-0640P-A0050 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - RACK LAYOUT |
| 1-0640P-A0051 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - POWER SUPPLY WIRING DIAGRAM |
| 1-0640P-A0052 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - SLOT 1 WIRING DIAGRAM |
| 1-0640P-A0053 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - SLOT 2 WIRING DIAGRAM |
| 1-0640P-A0054 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - SLOT 3 WIRING DIAGRAM |
| 1-0640P-A0055 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - SLOT 4 WIRING DIAGRAM |
| 1-0640P-A0056 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - SLOT 5 WIRING DIAGRAM |
| 1-0640P-A0057 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - SLOT 6 WIRING DIAGRAM |
| 1-0640P-A0058 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M004 - RELAY CARD WIRING DIAGRAM |
| 1-0640P-A0059 | 001 | 0 | SWITCHGEAR - SGR-M004 - DEMOLITION |
| 1-0640P-A0060 | 001 | 0 | SWITCHGEAR - SGR-M004 - PANEL LAYOUT |
| 1-0640P-E0003 | 001 | 0 | PUMP PP-4 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0640P-E0004 | 001 | 0 | PUMP PP-4 - MOTOR STARTER SCHEMATIC |
| 1-0640P-A0061 | 001 | 0 | PUMP PP-4 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0640P-A0061 | 002 | 0 | PUMP PP-4 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0640P-A0062 | 001 | 0 | LOCAL CONTROL PANEL - LCP-5 - DEMOLITION |
| 1-0640P-A0063 | 001 | 0 | LOCAL CONTROL PANEL - LCP-5 - PANEL LAYOUT |
| 1-0640P-A0064 | 001 | 0 | LOCAL CONTROL PANEL - LCP-5 - POWER DISTRIBUTION |
| 1-0640P-A0065 | 001 | 0 | PLC-M005 - RACK LAYOUT |
| 1-0640P-A0066 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - RACK LAYOUT |
| 1-0640P-A0067 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - POWER SUPPLY WIRING DIAGRAM |
| 1-0640P-A0068 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - SLOT 1 WIRING DIAGRAM |
| 1-0640P-A0069 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - SLOT 2 WIRING DIAGRAM |
| 1-0640P-A0070 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - SLOT 3 WIRING DIAGRAM |
| 1-0640P-A0071 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - SLOT 4 WIRING DIAGRAM |
| 1-0640P-A0072 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - SLOT 5 WIRING DIAGRAM |
| 1-0640P-A0073 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M005 - RELAY CARD WIRING DIAGRAM |
| 1-0640P-A0074 | 001 | 0 | LOCAL CONTROL PANEL - LCP-6 - DEMOLITION |
| 1-0640P-A0075 | 001 | 0 | LOCAL CONTROL PANEL - LCP-6 - PANEL LAYOUT |
| 1-0640P-A0076 | 001 | 0 | LOCAL CONTROL PANEL - LCP-6 - POWER DISTRIBUTION |
| 1-0640P-A0077 | 001 | 0 | PLC-M006 - RACK LAYOUT |
| 1-0640P-A0078 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - RACK LAYOUT |
| 1-0640P-A0079 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - POWER SUPPLY WIRING DIAGRAM |
| 1-0640P-A0080 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - SLOT 1 WIRING DIAGRAM |
| 1-0640P-A0081 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - SLOT 2 WIRING DIAGRAM |
| 1-0640P-A0082 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - SLOT 3 WIRING DIAGRAM |
| 1-0640P-A0083 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - SLOT 4 WIRING DIAGRAM |

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| 1-0640P-A0084 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - SLOT 5 WIRING DIAGRAM |
| 1-0640P-A0085 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - SLOT 6 WIRING DIAGRAM |
| 1-0640P-A0086 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M006 - RELAY CARD WIRING DIAGRAM |
| 1-0640P-A0087 | 001 | 0 | SWITCHGEAR - SGR-M006 - DEMOLITION |
| 1-0640P-A0088 | 001 | 0 | SWITCHGEAR - SGR-M006 - PANEL LAYOUT |
| 1-0640P-E0005 | 001 | 0 | PUMP PP-6 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0640P-E0006 | 001 | 0 | PUMP PP-6 - MOTOR STARTER SCHEMATIC |
| 1-0640P-A0089 | 001 | 0 | PUMP PP-6 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0640P-A0089 | 002 | 0 | PUMP PP-6 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0640P-A0090 | 001 | 0 | NETWORK ARCHITECTURE DIAGRAM |
| 1-0640P-E0007 | 001 | 0 | FLOOR PLAN - ELECTRICAL & CONTROL ROOMS |
| 1-0640P-E0008 | 001 | 0 | FLOOR PLAN - UPPER PUMP LEVEL |
| 1-0640P-E0009 | 001 | 0 | FLOOR PLAN - PUMP LEVEL |
| 1-0640P-E0010 | 001 | 0 | FLOOR PLAN - ELEVATION AND CROSS-SECTION |
| 1-0640P-E0010 | 002 | 0 | FLOOR PLAN - ELEVATION AND CROSS-SECTION |
| 1-0640P-E0010 | 003 | 0 | FLOOR PLAN - ELEVATION AND CROSS-SECTION |
| 1-0640P-E0010 | 004 | 0 | FLOOR PLAN - ELEVATION AND CROSS-SECTION |
| 1-0640P-E0010 | 005 | 0 | FLOOR PLAN - ELEVATION AND CROSS-SECTION |
| 1-0640P-E0011 | 001 | 0 | FLOOR PLAN - UPPER LEVEL (MCPHILLIPS CONTROL CENTRE) |
| 1-0640M-P0009 | 001 | 2 | PROCESS & INSTRUMENTATION DIAGRAM DISCHARGE HEADER |
| 1-0640M-P0012 | 001 | 1 | PROCESS & INSTRUMENTATION DIAGRAM MISCELLANEOUS |
| 1-0640P-A0091 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1500-1 |
| 1-0640P-A0092 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1500-2 |
| 1-0640P-A0093 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1501-1 |
| 1-0640P-A0094 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1501-2 |
| 1-0640P-A0095 | 001 | 0 | STATION FLOOD LOCKOUT 2 - LSH-M5900-2 |

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| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
|----------------|-------|----------|--|
| 1-0630P-D0001 | 001 | 0 | COVER PAGE |
| 1-0630P-D0002 | 001 | 0 | INDEX PAGE 1 OF 2 |
| 1-0630P-D0002 | 002 | 0 | INDEX PAGE 2 OF 2 |
| 1-0630P-A0001 | 001 | 0 | MAIN CONTROL PANEL (MCP) - DEMOLITION |
| 1-0630P-A0002 | 001 | 0 | MAIN CONTROL PANEL (MCP) - PANEL LAYOUT |
| 1-0630P-A0003 | 001 | 0 | MAIN CONTROL PANEL (MCP) - POWER DISTRIBUTION |
| 1-0630P-A0004 | 001 | 0 | STATION PLC - PLC-M800 - RACK LAYOUT |
| 1-0630P-A0005 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800-A - RACK LAYOUT |
| 1-0630P-A0006 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800-D - RACK LAYOUT |
| 1-0630P-A0007 | 001 | 0 | LOCAL CONTROL PANEL - LCP-21 - DEMOLITION |
| 1-0630P-A0008 | 001 | 0 | LOCAL CONTROL PANEL - LCP-21 - PANEL LAYOUT |
| 1-0630P-A0009 | 001 | 0 | LOCAL CONTROL PANEL - LCP-21 - POWER DISTRIBUTION |
| 1-0630P-A0010 | 001 | 0 | PLC-M021 - RACK LAYOUT |
| 1-0630P-A0011 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - RACK LAYOUT |
| 1-0630P-A0012 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - POWER SUPPLY WIRING DIAGRAM |
| 1-0630P-A0013 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - SLOT 1 WIRING DIAGRAM |
| 1-0630P-A0014 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - SLOT 2 WIRING DIAGRAM |
| 1-0630P-A0015 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - SLOT 3 WIRING DIAGRAM |
| 1-0630P-A0016 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - SLOT 4 WIRING DIAGRAM |
| 1-0630P-A0017 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - SLOT 5 WIRING DIAGRAM |

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| 1-0630P-A0018 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - SLOT 6 WIRING DIAGRAM |
| 1-0630P-A0019 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M021 - RELAY CARD WIRING DIAGRAM |
| 1-0630P-A0020 | 001 | 0 | SWITCHGEAR - SGR-M021 - DEMOLITION |
| 1-0630P-A0021 | 001 | 0 | SWITCHGEAR - SGR-M021 - PANEL LAYOUT |
| 1-0630P-E0001 | 001 | 0 | PUMP PP-21 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0630P-E0002 | 001 | 0 | PUMP PP-21 - MOTOR STARTER SCHEMATIC |
| 1-0630P-A0022 | 001 | 0 | PUMP PP-21 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0630P-A0022 | 002 | 0 | PUMP PP-21 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0630P-A0023 | 001 | 0 | LOCAL CONTROL PANEL - LCP-22 - DEMOLITION |
| 1-0630P-A0024 | 001 | 0 | LOCAL CONTROL PANEL - LCP-22 - PANEL LAYOUT |
| 1-0630P-A0025 | 001 | 0 | LOCAL CONTROL PANEL - LCP-22 - POWER DISTRIBUTION |
| 1-0630P-A0026 | 001 | 0 | PLC-M022 - RACK LAYOUT |
| 1-0630P-A0027 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - RACK LAYOUT |
| 1-0630P-A0028 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - POWER SUPPLY WIRING DIAGRAM |
| 1-0630P-A0029 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - SLOT 1 WIRING DIAGRAM |
| 1-0630P-A0030 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - SLOT 2 WIRING DIAGRAM |
| 1-0630P-A0031 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - SLOT 3 WIRING DIAGRAM |
| 1-0630P-A0032 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - SLOT 4 WIRING DIAGRAM |
| 1-0630P-A0033 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - SLOT 5 WIRING DIAGRAM |
| 1-0630P-A0034 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M022 - RELAY CARD WIRING DIAGRAM |
| 1-0630P-A0035 | 001 | 0 | LOCAL CONTROL PANEL - LCP-23 - DEMOLITION |
| 1-0630P-A0036 | 001 | 0 | LOCAL CONTROL PANEL - LCP-23 - PANEL LAYOUT |
| 1-0630P-A0037 | 001 | 0 | LOCAL CONTROL PANEL - LCP-23 - POWER DISTRIBUTION |
| 1-0630P-A0038 | 001 | 0 | PLC-M023 - RACK LAYOUT |
| 1-0630P-A0039 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - RACK LAYOUT |
| 1-0630P-A0040 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - POWER SUPPLY WIRING DIAGRAM |
| 1-0630P-A0041 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - SLOT 1 WIRING DIAGRAM |
| 1-0630P-A0042 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - SLOT 2 WIRING DIAGRAM |
| 1-0630P-A0043 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - SLOT 3 WIRING DIAGRAM |
| 1-0630P-A0044 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - SLOT 4 WIRING DIAGRAM |
| 1-0630P-A0045 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - SLOT 5 WIRING DIAGRAM |
| 1-0630P-A0046 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - SLOT 6 WIRING DIAGRAM |
| 1-0630P-A0047 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M023 - RELAY CARD WIRING DIAGRAM |
| 1-0630P-A0048 | 001 | 0 | SWITCHGEAR - SGR-M023 - DEMOLITION |
| 1-0630P-A0049 | 001 | 0 | SWITCHGEAR - SGR-M023 - PANEL LAYOUT |
| 1-0630P-E0003 | 001 | 0 | PUMP PP-23 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0630P-E0004 | 001 | 0 | PUMP PP-23 - MOTOR STARTER SCHEMATIC |
| 1-0630P-A0050 | 001 | 0 | PUMP PP-23 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0630P-A0050 | 002 | 0 | PUMP PP-23 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0630P-A0051 | 001 | 0 | LOCAL CONTROL PANEL - LCP-25 - DEMOLITION |
| 1-0630P-A0052 | 001 | 0 | LOCAL CONTROL PANEL - LCP-25 - PANEL LAYOUT |

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| 1-0630P-A0053 | 001 | 0 | LOCAL CONTROL PANEL - LCP-25 - POWER DISTRIBUTION |
| 1-0630P-A0054 | 001 | 0 | PLC-M025 - RACK LAYOUT |
| 1-0630P-A0055 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - RACK LAYOUT |
| 1-0630P-A0056 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - POWER SUPPLY WIRING DIAGRAM |
| 1-0630P-A0057 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - SLOT 1 WIRING DIAGRAM |
| 1-0630P-A0058 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - SLOT 2 WIRING DIAGRAM |
| 1-0630P-A0059 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - SLOT 3 WIRING DIAGRAM |
| 1-0630P-A0060 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - SLOT 4 WIRING DIAGRAM |
| 1-0630P-A0061 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - SLOT 5 WIRING DIAGRAM |
| 1-0630P-A0062 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - SLOT 6 WIRING DIAGRAM |
| 1-0630P-A0063 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M025 - RELAY CARD WIRING DIAGRAM |
| 1-0630P-A0064 | 001 | 0 | SWITCHGEAR - SGR-M025 - DEMOLITION |
| 1-0630P-A0065 | 001 | 0 | SWITCHGEAR - SGR-M025 - PANEL LAYOUT |
| 1-0630P-E0005 | 001 | 0 | PUMP PP-25 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0630P-E0006 | 001 | 0 | PUMP PP-25 - MOTOR STARTER SCHEMATIC |
| 1-0630P-A0066 | 001 | 0 | PUMP PP-25 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0630P-A0066 | 002 | 0 | PUMP PP-25 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0630P-A0067 | 001 | 0 | LOCAL CONTROL PANEL - LCP-26 - DEMOLITION |
| 1-0630P-A0068 | 001 | 0 | LOCAL CONTROL PANEL - LCP-26 - PANEL LAYOUT |
| 1-0630P-A0069 | 001 | 0 | LOCAL CONTROL PANEL - LCP-26 - POWER DISTRIBUTION |
| 1-0630P-A0070 | 001 | 0 | PLC-M026 - RACK LAYOUT |
| 1-0630P-A0071 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - RACK LAYOUT |
| 1-0630P-A0072 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - POWER SUPPLY WIRING DIAGRAM |
| 1-0630P-A0073 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - SLOT 1 WIRING DIAGRAM |
| 1-0630P-A0074 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - SLOT 2 WIRING DIAGRAM |
| 1-0630P-A0075 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - SLOT 3 WIRING DIAGRAM |
| 1-0630P-A0076 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - SLOT 4 WIRING DIAGRAM |
| 1-0630P-A0077 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - SLOT 5 WIRING DIAGRAM |
| 1-0630P-A0078 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M026 - RELAY CARD WIRING DIAGRAM |
| 1-0630P-A0079 | 001 | 0 | NETWORK ARCHITECTURE DIAGRAM |
| 1-0630P-E0007 | 001 | 0 | FLOOR PLAN - ELECTRICAL ROOM |
| 1-0630P-E0008 | 001 | 0 | FLOOR PLAN - MEZZANINE LEVEL |
| 1-0630P-E0008 | 002 | 0 | FLOOR PLAN - MEZZANINE LEVEL |
| 1-0630P-E0009 | 001 | 0 | FLOOR PLAN - PUMP LEVEL |
| 1-0630P-E0010 | 001 | 0 | FLOOR PLAN - ELEVATION AND CROSS-SECTION |
| 1-0630M-P0009 | 001 | 2 | PROCESS & INSTRUMENTATION DIAGRAM DISCHARGE HEADER |
| 1-0630M-P0012 | 001 | 1 | PROCESS & INSTRUMENTATION DIAGRAM MISCELLANEOUS |
| 1-0630P-A0080 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1500-1 |
| 1-0630P-A0081 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1500-2 |
| 1-0630P-A0082 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1501-1 |
| 1-0630P-A0083 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1501-2 |
| 1-0630P-A0084 | 001 | 0 | STATION FLOOD LOCKOUT 2 - LSH-M5900-2 |

| Hurst RPS | | | |
|-----------------------|--------------|-----------------|--|
| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
| 1-0650P-D0001 | 001 | 0 | COVER PAGE |
| 1-0650P-D0002 | 001 | 0 | INDEX PAGE 1 OF 2 |
| 1-0650P-D0002 | 002 | 0 | INDEX PAGE 2 OF 2 |
| 1-0650P-A0001 | 001 | 0 | MAIN CONTROL PANEL (MCP) - DEMOLITION |
| 1-0650P-A0002 | 001 | 0 | MAIN CONTROL PANEL (MCP) - PANEL LAYOUT |
| 1-0650P-A0003 | 001 | 0 | MAIN CONTROL PANEL (MCP) - POWER DISTRIBUTION |
| 1-0650P-A0004 | 001 | 0 | STATION PLC - PLC-M800 - RACK LAYOUT |
| 1-0650P-A0005 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800-A - RACK LAYOUT |
| 1-0650P-A0006 | 001 | 0 | REMOTE I/O (RIO) - RIO-M800-D - RACK LAYOUT |
| 1-0650P-A0007 | 001 | 0 | LOCAL CONTROL PANEL - LCP-11 - DEMOLITION |
| 1-0650P-A0008 | 001 | 0 | LOCAL CONTROL PANEL - LCP-11 - PANEL LAYOUT |
| 1-0650P-A0009 | 001 | 0 | LOCAL CONTROL PANEL - LCP-11 - POWER DISTRIBUTION |
| 1-0650P-A0010 | 001 | 0 | PLC-M011 - RACK LAYOUT |
| 1-0650P-A0011 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - RACK LAYOUT |
| 1-0650P-A0012 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - POWER SUPPLY WIRING DIAGRAM |
| 1-0650P-A0013 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - SLOT 1 WIRING DIAGRAM |
| 1-0650P-A0014 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - SLOT 2 WIRING DIAGRAM |
| 1-0650P-A0015 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - SLOT 3 WIRING DIAGRAM |
| 1-0650P-A0016 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - SLOT 4 WIRING DIAGRAM |
| 1-0650P-A0017 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - SLOT 5 WIRING DIAGRAM |
| 1-0650P-A0018 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - SLOT 6 WIRING DIAGRAM |
| 1-0650P-A0019 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M011 - RELAY CARD WIRING DIAGRAM |
| 1-0650P-A0020 | 001 | 0 | SWITCHGEAR - SGR-M011 - DEMOLITION |
| 1-0650P-A0021 | 001 | 0 | SWITCHGEAR - SGR-M011 - PANEL LAYOUT |
| 1-0650P-E0001 | 001 | 0 | PUMP PP-11 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0650P-E0002 | 001 | 0 | PUMP PP-11 - MOTOR STARTER SCHEMATIC |
| 1-0650P-A0022 | 001 | 0 | PUMP PP-11 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0022 | 002 | 0 | PUMP PP-11 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0023 | 001 | 0 | LOCAL CONTROL PANEL - LCP-12 - DEMOLITION |
| 1-0650P-A0024 | 001 | 0 | LOCAL CONTROL PANEL - LCP-12 - PANEL LAYOUT |
| 1-0650P-A0025 | 001 | 0 | LOCAL CONTROL PANEL - LCP-12 - POWER DISTRIBUTION |
| 1-0650P-A0026 | 001 | 0 | PLC-M012 - RACK LAYOUT |
| 1-0650P-A0027 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - RACK LAYOUT |
| 1-0650P-A0028 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - POWER SUPPLY WIRING DIAGRAM |
| 1-0650P-A0029 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - SLOT 1 WIRING DIAGRAM |
| 1-0650P-A0030 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - SLOT 2 WIRING DIAGRAM |
| 1-0650P-A0031 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - SLOT 3 WIRING DIAGRAM |
| 1-0650P-A0032 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - SLOT 4 WIRING DIAGRAM |
| 1-0650P-A0033 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - SLOT 5 WIRING DIAGRAM |
| 1-0650P-A0034 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M012 - RELAY CARD WIRING DIAGRAM |
| 1-0650P-A0035 | 001 | 0 | SWITCHGEAR - SGR-M012 - DEMOLITION |
| 1-0650P-A0036 | 001 | 0 | SWITCHGEAR - SGR-M012 - PANEL LAYOUT |

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| 1-0650P-E0003 | 001 | 0 | PUMP PP-12 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0650P-E0004 | 001 | 0 | PUMP PP-12 - MOTOR STARTER SCHEMATIC |
| 1-0650P-A0037 | 001 | 0 | PUMP PP-12 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0037 | 002 | 0 | PUMP PP-12 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0038 | 001 | 0 | LOCAL CONTROL PANEL - LCP-14 - DEMOLITION |
| 1-0650P-A0039 | 001 | 0 | LOCAL CONTROL PANEL - LCP-14 - PANEL LAYOUT |
| 1-0650P-A0040 | 001 | 0 | LOCAL CONTROL PANEL - LCP-14 - POWER DISTRIBUTION |
| 1-0650P-A0041 | 001 | 0 | PLC-M014 - RACK LAYOUT |
| 1-0650P-A0042 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - RACK LAYOUT |
| 1-0650P-A0043 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - POWER SUPPLY WIRING DIAGRAM |
| 1-0650P-A0044 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - SLOT 1 WIRING DIAGRAM |
| 1-0650P-A0045 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - SLOT 2 WIRING DIAGRAM |
| 1-0650P-A0046 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - SLOT 3 WIRING DIAGRAM |
| 1-0650P-A0047 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - SLOT 4 WIRING DIAGRAM |
| 1-0650P-A0048 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - SLOT 5 WIRING DIAGRAM |
| 1-0650P-A0049 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M014 - RELAY CARD WIRING DIAGRAM |
| 1-0650P-A0050 | 001 | 0 | SWITCHGEAR - SGR-M014 - DEMOLITION |
| 1-0650P-A0051 | 001 | 0 | SWITCHGEAR - SGR-M014 - PANEL LAYOUT |
| 1-0650P-E0005 | 001 | 0 | PUMP PP-14 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0650P-E0006 | 001 | 0 | PUMP PP-14 - MOTOR STARTER SCHEMATIC |
| 1-0650P-A0052 | 001 | 0 | PUMP PP-14 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0052 | 002 | 0 | PUMP PP-14 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0053 | 001 | 0 | LOCAL CONTROL PANEL - LCP-15 - DEMOLITION |
| 1-0650P-A0054 | 001 | 0 | LOCAL CONTROL PANEL - LCP-15 - PANEL LAYOUT |
| 1-0650P-A0055 | 001 | 0 | LOCAL CONTROL PANEL - LCP-15 - POWER DISTRIBUTION |
| 1-0650P-A0056 | 001 | 0 | PLC-M015 - RACK LAYOUT |
| 1-0650P-A0057 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - RACK LAYOUT |
| 1-0650P-A0058 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - POWER SUPPLY WIRING DIAGRAM |
| 1-0650P-A0059 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - SLOT 1 WIRING DIAGRAM |
| 1-0650P-A0060 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - SLOT 2 WIRING DIAGRAM |
| 1-0650P-A0061 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - SLOT 3 WIRING DIAGRAM |
| 1-0650P-A0062 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - SLOT 4 WIRING DIAGRAM |
| 1-0650P-A0063 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - SLOT 5 WIRING DIAGRAM |
| 1-0650P-A0064 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M015 - RELAY CARD WIRING DIAGRAM |
| 1-0650P-A0065 | 001 | 0 | SWITCHGEAR - SGR-M015 - DEMOLITION |
| 1-0650P-A0066 | 001 | 0 | SWITCHGEAR - SGR-M015 - PANEL LAYOUT |
| 1-0650P-E0007 | 001 | 0 | PUMP PP-15 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0650P-E0008 | 001 | 0 | PUMP PP-15 - MOTOR STARTER SCHEMATIC |
| 1-0650P-A0067 | 001 | 0 | PUMP PP-15 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0067 | 002 | 0 | PUMP PP-15 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0068 | 001 | 0 | LOCAL CONTROL PANEL - LCP-16 - DEMOLITION |
| 1-0650P-A0069 | 001 | 0 | LOCAL CONTROL PANEL - LCP-16 - PANEL LAYOUT |

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| 1-0650P-A0070 | 001 | 0 | LOCAL CONTROL PANEL - LCP-16 - POWER DISTRIBUTION |
| 1-0650P-A0071 | 001 | 0 | PLC-M016 - RACK LAYOUT |
| 1-0650P-A0072 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - RACK LAYOUT |
| 1-0650P-A0073 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - POWER SUPPLY WIRING DIAGRAM |
| 1-0650P-A0074 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - SLOT 1 WIRING DIAGRAM |
| 1-0650P-A0075 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - SLOT 2 WIRING DIAGRAM |
| 1-0650P-A0076 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - SLOT 3 WIRING DIAGRAM |
| 1-0650P-A0077 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - SLOT 4 WIRING DIAGRAM |
| 1-0650P-A0078 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - SLOT 5 WIRING DIAGRAM |
| 1-0650P-A0079 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M016 - RELAY CARD WIRING DIAGRAM |
| 1-0650P-A0080 | 001 | 0 | SWITCHGEAR - SGR-M016 - DEMOLITION |
| 1-0650P-A0081 | 001 | 0 | SWITCHGEAR - SGR-M016 - PANEL LAYOUT |
| 1-0650P-E0009 | 001 | 0 | PUMP PP-16 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0650P-E0010 | 001 | 0 | PUMP PP-16 - MOTOR STARTER SCHEMATIC |
| 1-0650P-A0082 | 001 | 0 | PUMP PP-16 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0082 | 002 | 0 | PUMP PP-16 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0083 | 001 | 0 | LOCAL CONTROL PANEL - LCP-17 - DEMOLITION |
| 1-0650P-A0084 | 001 | 0 | LOCAL CONTROL PANEL - LCP-17 - PANEL LAYOUT |
| 1-0650P-A0085 | 001 | 0 | LOCAL CONTROL PANEL - LCP-17 - POWER DISTRIBUTION |
| 1-0650P-A0086 | 001 | 0 | PLC-M017 - RACK LAYOUT |
| 1-0650P-A0087 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - RACK LAYOUT |
| 1-0650P-A0088 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - POWER SUPPLY WIRING DIAGRAM |
| 1-0650P-A0089 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - SLOT 1 WIRING DIAGRAM |
| 1-0650P-A0090 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - SLOT 2 WIRING DIAGRAM |
| 1-0650P-A0091 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - SLOT 3 WIRING DIAGRAM |
| 1-0650P-A0092 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - SLOT 4 WIRING DIAGRAM |
| 1-0650P-A0093 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - SLOT 5 WIRING DIAGRAM |
| 1-0650P-A0094 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - SLOT 6 WIRING DIAGRAM |
| 1-0650P-A0095 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-M017 - RELAY CARD WIRING DIAGRAM |
| 1-0650P-A0096 | 001 | 0 | SWITCHGEAR - SGR-M017 - DEMOLITION |
| 1-0650P-A0097 | 001 | 0 | SWITCHGEAR - SGR-M017 - PANEL LAYOUT |
| 1-0650P-E0011 | 001 | 0 | PUMP PP-17 - MOTOR STARTER SCHEMATIC - DEMOLITION |
| 1-0650P-E0012 | 001 | 0 | PUMP PP-17 - MOTOR STARTER SCHEMATIC |
| 1-0650P-A0098 | 001 | 0 | PUMP PP-17 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0098 | 002 | 0 | PUMP PP-17 - STATOR WINDING RESISTANCE TEMPERATURE DETECTOR (RTD) - WIRING DIAGRAM |
| 1-0650P-A0099 | 001 | 0 | NETWORK ARCHITECTURE DIAGRAM |
| 1-0650P-E0013 | 001 | 0 | UPS PANEL - PNL-M710U - ELEVATION AND SCHEDULES |
| 1-0650P-E0014 | 001 | 0 | FLOOR PLAN - SWITCHGEAR |
| 1-0650P-E0015 | 001 | 0 | FLOOR PLAN - PUMP FLOOR |
| 1-0650P-E0016 | 001 | 0 | FLOOR PLAN - CRAWLSPACE |
| 1-0650M-E0019 | 001 | 2 | THREE LINE DIAGRAM 4160V MAIN BREAKER 52-M1 |
| 1-0650M-E0020 | 001 | 2 | THREE LINE DIAGRAM 4160V MAIN BREAKER 52-M2 |

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|-----------------------|--------------|-----------------|---|
| 1-0650M-P0013 | 001 | 2 | PROCESS & INSTRUMENTATION DIAGRAM DISCHARGE HEADER |
| 1-0650M-P0019 | 001 | 1 | PROCESS & INSTRUMENTATION DIAGRAM MISCELLANEOUS |
| 1-0650P-A0100 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1500-1 |
| 1-0650P-A0101 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1500-2 |
| 1-0650P-A0102 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1501-1 |
| 1-0650P-A0103 | 001 | 0 | DISCHARGE HEADER PRESSURE TRANSMITTERS PIT-M1501-2 |
| 1-0650P-A0104 | 001 | 0 | STATION FLOOD LOCKOUT 2 - LSH-M5422-2 |
| DBPS and DCFF | | | |
| Drawing Number | Sheet | Rev. No. | Drawing Name and Title |
| 1-0601U-D0001 | 001 | 0 | COVER PAGE |
| 1-0601U-D0002 | 001 | 0 | INDEX PAGE |
| 1-0601U-A0001 | 001 | 0 | MAIN CONTROL PANEL (MCP) - DEMOLITION |
| 1-0601U-A0002 | 001 | 0 | MAIN CONTROL PANEL (MCP) - PANEL LAYOUT |
| 1-0601U-A0003 | 001 | 0 | MAIN CONTROL PANEL (MCP) - POWER DISTRIBUTION |
| 1-0601U-A0004 | 001 | 0 | REMOTE I/O (RIO) - RIO-D800-A - RACK LAYOUT |
| 1-0601U-A0005 | 001 | 0 | REMOTE I/O (RIO) - RIO-D800-D - RACK LAYOUT |
| 1-0601U-A0006 | 001 | 0 | CONTROL PANEL - CP-D21 - DEMOLITION |
| 1-0601U-A0007 | 001 | 0 | CONTROL PANEL - CP-D21 - PANEL LAYOUT |
| 1-0601U-A0008 | 001 | 0 | STATION PLC - PLC-D021 - RACK LAYOUT |
| 1-0601U-A0009 | 001 | 0 | REMOTE I/O (RIO) - RIO-D021 - DEMOLITION |
| 1-0601U-A0010 | 001 | 0 | REMOTE I/O (RIO) - RIO-D021 - RACK LAYOUT |
| 1-0601U-A0011 | 001 | 0 | REMOTE I/O (RIO) - RIO-D011 - DEMOLITION |
| 1-0601U-A0012 | 001 | 0 | REMOTE I/O (RIO) - RIO-D011 - RACK LAYOUT |
| 1-0601U-A0013 | 001 | 0 | REMOTE I/O (RIO) - RIO-D012 - DEMOLITION |
| 1-0601U-A0014 | 001 | 0 | REMOTE I/O (RIO) - RIO-D012 - RACK LAYOUT |
| 1-0601U-A0015 | 001 | 0 | MAIN CONTROL PANEL (MCP) REMOTE I/O (RIO) - RIO-Z800 - DEMOLITION (CHEMICAL FEED FACILITY) |
| 1-0601U-A0016 | 001 | 0 | MAIN CONTROL PANEL (MCP) REMOTE I/O (RIO) - RIO-Z800 - RACK LAYOUT (CHEMICAL FEED FACILITY) |
| 1-0601U-A0017 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - DEMOLITION |
| 1-0601U-A0018 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - PANEL LAYOUT |
| 1-0601U-A0019 | 001 | 0 | LOCAL CONTROL PANEL - LCP-3 - POWER DISTRIBUTION |
| 1-0601U-A0020 | 001 | 0 | PLC-D003 - RACK LAYOUT |
| 1-0601U-A0021 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - RACK LAYOUT |
| 1-0601U-A0022 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - POWER SUPPLY WIRING DIAGRAM |
| 1-0601U-A0023 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - SLOT 1 WIRING DIAGRAM |
| 1-0601U-A0024 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - SLOT 2 WIRING DIAGRAM |
| 1-0601U-A0025 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - SLOT 3 WIRING DIAGRAM |
| 1-0601U-A0026 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - SLOT 4 WIRING DIAGRAM |
| 1-0601U-A0027 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - SLOT 5 WIRING DIAGRAM |
| 1-0601U-A0028 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D003 - RELAY CARD WIRING DIAGRAM |
| 1-0601U-A0029 | 001 | 0 | LOCAL CONTROL PANEL - LCP-4 - DEMOLITION |
| 1-0601U-A0030 | 001 | 0 | LOCAL CONTROL PANEL - LCP-4 - PANEL LAYOUT |
| 1-0601U-A0031 | 001 | 0 | LOCAL CONTROL PANEL - LCP-4 - POWER DISTRIBUTION |
| 1-0601U-A0032 | 001 | 0 | PLC-D004 - RACK LAYOUT |
| 1-0601U-A0033 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - RACK LAYOUT |
| 1-0601U-A0034 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - POWER SUPPLY WIRING DIAGRAM |
| 1-0601U-A0035 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - SLOT 1 WIRING DIAGRAM |
| 1-0601U-A0036 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - SLOT 2 WIRING DIAGRAM |

| | | | |
|---------------|-----|---|--|
| 1-0601U-A0037 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - SLOT 3 WIRING DIAGRAM |
| 1-0601U-A0038 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - SLOT 4 WIRING DIAGRAM |
| 1-0601U-A0039 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - SLOT 5 WIRING DIAGRAM |
| 1-0601U-A0040 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D004 - RELAY CARD WIRING DIAGRAM |
| 1-0601U-A0041 | 001 | 0 | LOCAL CONTROL PANEL - LCP-5 - DEMOLITION |
| 1-0601U-A0042 | 001 | 0 | LOCAL CONTROL PANEL - LCP-5 - PANEL LAYOUT |
| 1-0601U-A0043 | 001 | 0 | LOCAL CONTROL PANEL - LCP-5 - POWER DISTRIBUTION |
| 1-0601U-A0044 | 001 | 0 | PLC-D005 - RACK LAYOUT |
| 1-0601U-A0045 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - RACK LAYOUT |
| 1-0601U-A0046 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - POWER SUPPLY WIRING DIAGRAM |
| 1-0601U-A0047 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - SLOT 1 WIRING DIAGRAM |
| 1-0601U-A0048 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - SLOT 2 WIRING DIAGRAM |
| 1-0601U-A0049 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - SLOT 3 WIRING DIAGRAM |
| 1-0601U-A0050 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - SLOT 4 WIRING DIAGRAM |
| 1-0601U-A0051 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - SLOT 5 WIRING DIAGRAM |
| 1-0601U-A0052 | 001 | 0 | PUMP AND MOTOR CONDITION MONITORING UNIT - PMCM-D005 - RELAY CARD WIRING DIAGRAM |
| 1-0601U-A0053 | 001 | 0 | NETWORK ARCHITECTURE DIAGRAM |
| 1-0601U-E0011 | 001 | 0 | FLOOR PLAN - ELECTRICAL ROOM |
| 1-0601U-E0012 | 001 | 0 | FLOOR PLAN - MEZZANINE LEVEL |
| 1-0601U-E0013 | 001 | 0 | FLOOR PLAN - PUMP LEVEL |
| 1-0601U-E0014 | 001 | 0 | FLOOR PLAN - EQUIPMENT AND CONTROL LAYOUT (CHEMICAL FEED FACILITY) |
| 1-0601U-E0015 | 001 | 0 | FLOOR PLAN - TELEPHONE AND DATA ADMINISTRATION AREA (WATER TREATMENT PLANT) |

E2. HAZARDOUS MATERIALS

- E2.1 If suspected asbestos or other hazardous materials are encountered during the Work of the Contract, the Contractor shall stop all Work and notify the Contract Administrator immediately. Removal of hazardous materials shall be dealt with by the City and the Contractor shall await further instruction by the Contract Administrator.
- E2.1.1 Notwithstanding E2.1, any asbestos identified in the HMIS asbestos reports provided in Appendix J – Asbestos Reports shall be the responsibility of the Contractor in accordance with Section 02 82 00.01 – Asbestos Abatement – Minimum Precautions and Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions in the NMS.
- (a) HMIS asbestos reports for all Sites containing confirmed and presumed asbestos are provided as Appendix J – Asbestos Reports.
 - (b) For reference, the City updates the HMIS asbestos reports on an annual basis and will provide updated reports throughout the duration of the project.
- E2.2 Further to E2.1, if additional asbestos has been discovered beyond what has been identified in the HMIS asbestos reports included in Appendix J – Asbestos Reports, the City may require the Contractor to undertake any asbestos abatement to facilitate the Work.
- E2.2.1 This additional asbestos abatement work will be paid via cash allowance as indicated on Form B. Cost of additional work shall be evaluated by the methods outlined in C7.4, and a change order prepared by the Contract Administrator. Cost of the change order will be paid on the progress estimate and deducted from the cash allowance. If the valuation of the

authorized work exceeds the value of the cash allowance, the Contract Price will be adjusted by the shortfall.

E2.2.2 For clarity, if future HMIS asbestos reports provided by the City identify additional asbestos that impacts the Work, the additional asbestos abatement work will be addressed in accordance with E2.2.1.

E2.3 The City utilizes chlorine gas on Site as part of the water treatment process at the McPhillips RPS, MacLean RPS, and Hurst RPS. An ambient chlorine gas detector is installed with alarming to notify personnel of any potential toxic chlorine gas levels. The Contractor is expected to follow City policies regarding chlorine gas safety.

E2.3.1 Chlorine gas is not utilized at the TBPS, DBPS and DCFF, and SLAIF.

E3. MOBILIZATION AND DEMOBILIZATION

E3.1 General

E3.1.1 The Contractor shall mobilize all on Site Work and other temporary facilities required for completion of the Work. Upon completion of construction activities, the Contractor shall remove all on Site Work and other temporary facilities and restore the Site to equal or better than original condition.

E3.1.2 The Contractor shall inspect the Site with the Contract Administrator to verify and document existing conditions prior to mobilization to Site. The Contractor shall inspect the Site with the Contract Administrator after demobilization has been completed to document and verify that the Site has been restored to equal or better than the original condition. The site conditions upon demobilization shall be documented in a brief report comparing original to final conditions and submitted to the Contract Administrator.

E3.1.3 The Contractor shall provide a workspace at each Site for use by the Contract Administrator. The Contract Administrator will only require a workspace periodically throughout construction; however, the workspace shall be made available for the Contract Administrator at any time when construction activities are occurring on-Site. The workspace shall include sufficient table or desk space for a full size drawing, a chair, and access to an electrical outlet and internet connection.

E3.1.4 Utility connections will not be permitted within facility compound areas unless approved otherwise in writing by the Contract Administrator.

E3.2 Submittals

E3.2.1 Provide Submittals in accordance with Section 01 33 00 – Submittal Procedures in the NMS.

E3.2.2 Submit a brief report documenting site conditions upon demobilization as described in E3.1.2.

E3.2.3 Site Laydown Plan

(a) The Contractor shall submit to the Contract Administrator for review and approval ten (10) Business Days prior to mobilization at each Site, a Site Laydown Plan for each Site that includes, but is not limited to:

- (i) laydown area location(s), dimensions and surfacing materials if required;
- (ii) office, equipment and material storage facility sizes and locations;
- (iii) utility connection location(s), if required, with installation and removal details;
- (iv) temporary secure fencing limit and gate locations, if required;
- (v) location and number of parking accommodations; and
- (vi) temporary traffic control measures, if required.

E3.3 Site Laydown Areas

- E3.3.1 Permitted site laydown areas have been identified by the City and provided in Appendix P – Laydown Areas. For clarity, existing City drawings from other projects have been used as the basis for these laydown drawings and the Contractor shall refer solely to the text in red.
- (a) The permitted site laydown areas are located within the existing facility compound fence at the WTP, DBPS and DCFF, Hurst RPS, and TBPS Sites.
 - (b) The permitted site laydown area for the MacLean RPS and McPhillips RPS Sites are not located within an existing facility compound fence.
 - (c) Permitted site laydown areas have not been identified for the SLAIF Site.
- E3.3.2 For the TBPS and McPhillips RPS Sites, adjacent streets may accommodate site laydown areas as identified by the City and provided in Appendix P – Laydown Areas. The Contractor shall obtain a Use of Street Permit for any on-street laydown areas. Access to existing facility entrances and buildings shall not be impeded.
- E3.3.3 For the SLAIF Site, the City will provide, at no cost to the Contractor, accommodations for office space and equipment and material storage space within the existing facility. The Contractor will not have unlimited or exclusive use of any identified office or material and equipment storage spaces and the City reserves the right to limit or reassign office and equipment and material storage spaces as required for City operations or work by others. The Contractor shall communicate with the Contract Administrator during the development of their Site Laydown Plan to collaboratively determine reasonable office and equipment and material storage spaces for the Work.
- E3.3.4 The Contractor shall at all times maintain access to any and all areas required for City operations unless approved otherwise in writing by the Contract Administrator.
- E3.3.5 The Contractor shall at all times keep the laydown area clean, neat, and orderly. Materials and equipment shall be properly stored and organized and all garbage and debris shall be promptly and properly collected and disposed of off-site.
- E3.3.6 If applicable, the Contractor shall clear snow cover from the proposed laydown area and remove it from the Site prior to commencement of the Work. During construction activities, the Contractor shall clear snow from the laydown area and remove it from the Site on a regular basis, if required. The methodology for clearing and removing snow cover shall be subject to the approval of the Contract Administrator.
- E3.3.7 Access to laydown areas within existing facility compound fencing shall be provided from existing Site access and infrastructure. Modification of existing fencing, or addition of gates, access points, and access roads will not be permitted.
- E3.3.8 Subject to E3.3.1, the Contractor has discretion on what areas of the Site they wish to secure and the methods of implementing security.
- (a) For designated laydown areas, within existing facility compound fencing, Contractor fences and gates will not be permitted.
 - (b) For laydown areas that are not within existing facility compound fencing, these areas may be fenced and gated for security, to discourage pedestrian entrance, and to control potential hazards to the public, particularly children. The Contractor shall not fence off areas where public traffic or pedestrians need to travel, such as open roadway lanes or sidewalk/bike paths.
- E3.3.9 The City may permit the use of existing facility parking accommodations. Request for use of existing facility parking accommodations shall be indicated on the Site Laydown Plan Submittal including location of each parking spot requested which will be reviewed by the Contract Administrator on a case-by-case basis.

E3.4 Measurement and Payment

- E3.4.1 Mobilization and demobilization will not be measured and will be paid for at the Contract lump sum prices by facility for "Mobilization / Demobilization" for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.
- E3.4.2 Mobilization and demobilization will be paid for at a percentage of the Contract Lump Sum Prices by facility, as specified herein. These percentages shall be as follows:
- (a) 60% upon mobilization and commencement of Work on site; and
 - (b) 40% upon completion of the Work and demobilization from site.

E4. ACCESS AND SECURITY

E4.1 Access to Facilities

- E4.1.1 The Contractor will be issued keys for access to Site.
- (a) The Contractor is to coordinate with the City on the number of keys that will be required for the Contractor's employees and Subcontractors.
 - (b) The first progress payment will be deducted ten thousand dollars (\$10,000) as a deposit for all keys. The Contract Administrator will provide notification to the Contractor of which line item has been reduced to accommodate this deduction.
 - (c) The Contractor is to return all keys prior to Total Performance. On return of all keys, including damaged keys, the ten thousand dollar (\$10,000) deposit will be released on the next progress payment.
 - (d) The Contractor is to immediately report any lost keys and return any damaged or non-functioning keys for replacement.
- E4.1.2 All entry doors into the facilities are to remain locked at all times.
- E4.1.3 The Contractor shall follow City access procedures regarding entrance and exit which the City will provide at the pre-construction meeting.
- E4.1.4 The Contractor and Subcontractors shall sign into log books when accessing facilities and notify WTP control room operator when arriving and leaving Site. Specific contact details will be provided by the City at the pre-construction meeting.

E4.2 Washroom Access

- E4.2.1 The Contractor will be permitted to use the City's washrooms within the facilities, provided the Contractor and Subcontractors maintain equal or better cleanliness. Washroom access may be revoked for instances of cleanliness issues.

E4.3 Use of GWWD Railway

E4.3.1 General

- (a) The City of Winnipeg owns and operates the GWWD Railway between the railway yard in St. Boniface (598 Plinquet Street) and SLAIF. Work trains routinely deliver fuel, sodium hypochlorite, and other supplies to SLAIF and materials for track upgrading and maintenance. The diesel locomotives are available along with an assortment of rolling stock. The GWWD Railway is available to the Contractor to deliver equipment and Material to the Work area. The GWWD Railway assumes no risk for the transportation of these goods and the Contractor must provide evidence of insurance as per D11.2 if they wish to utilize the use of the GWWD Railway.
- (b) The Contractor shall not have unlimited use of the GWWD Railway facilities and will be subject to the review and approval of the Submittals listed below.

- (c) Emergency railway services and rail services associated with the operation of the WTP, Shoal Lake aqueduct, and/or SLAIF will take precedence over material and equipment deliveries. Neither the City, nor the Contract Administrator, shall be held liable for failing to provide rail transportation in any event.
- (d) The Contractor shall ensure that all equipment, vehicles, personnel, and materials are kept off the railway and away from the track bed, unless instructed otherwise by the Contract Administrator. The Contractor shall provide all labour and equipment necessary for loading and unloading equipment and Materials including all equipment necessary to tie down loads.
- (e) The Contractor shall adhere to the City's COVID-19 safe work procedures for transportation on the GWWD Railway.

E4.3.2 Submittals

- (a) Provide Submittals in accordance with Section 01 33 00 – Submittal Procedures in the NMS.
- (b) Four (4) weeks prior to the commencement of Work at the SLAIF Site, the Contractor shall develop a preliminary schedule outlining the following:
 - (i) all required GWWD Railway activities and resources (i.e. GWWD Railway equipment, track car units, and operators);
 - (ii) staffhouse requirements; and
 - (iii) personnel transportation requirements.
- (c) Submit for review and approval the revisions to the SLAIF/ GWWD Railway schedule for rail service, as required. The revisions should be submitted together with the weekly Work Plan submissions.
- (d) Prior to GWWD Railway use and the transportation of Contractor equipment, all non-City of Winnipeg personnel will be required to sign and submit GWWD Railway waiver forms. The waiver is included in Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information).

E4.3.3 Train Service

- (a) Rolling stock that is available for the Contractor's use on this project:
 - (i) two (2) flatbed cars with a deck width of 2.44 m, deck length of 16.9 m, and a maximum load capacity of 55,000 kilograms;
 - (ii) one (1) ramp car with a deck with of 2.44 m, deck length of 16 m, and a maximum load capacity of 55,000 kilograms;
 - (iii) one (1) caboose; and
 - (iv) two (2) side dump cars with a capacity of 20 to 30 cubic m.
- (b) The GWWD Railway right-of-way has sufficient horizontal clearances to transport loads up to 3.66 m wide.

E4.3.4 Train Use and Scheduling

- (a) A train consists of one (1) locomotive, one (1) caboose, and any combination of the remaining rolling stock identified in E4.3.3.
- (b) A train crew shift consists of a train as previously described and the train crew (two (2) people). The maximum train crew shift duration allowed is twelve (12) hours per Calendar Day.
- (c) The GWWD Railway can provide one (1) train crew for use on this project. Each train crew can work a maximum of one (1) full train crew shift per Calendar Day and a maximum of ten (10) train crew shifts per fourteen (14) Calendar Day period.

E4.3.5 Transportation of Contractor's Equipment

- (a) Rolling stock identified in E4.3.3(a) will be made available to the Contractor for the transportation of large equipment to and from the Work area. Large equipment shall be loaded and unloaded at East Braintree if only one (1) piece of equipment is

required to be transported. If additional pieces of equipment are required to be transported, the equipment will be loaded and unloaded at the GWWD Railway yard in St. Boniface.

- (b) A mobile loading ramp is available at East Braintree with a capacity of 34,500 kilograms, width 2.7 m, length 5.15 m, and height variable from 1.04 to 1.50 m.
- (c) Earthen loading ramps are available at the GWWD Railway yard in St. Boniface and at the SLAIF, capacity not listed.
- (d) The loading and securing of Contractor's equipment is the responsibility of the Contractor.

E4.3.6 Transportation of Personnel

- (a) GWWD Railway Track Car Units
 - (i) One (1) track car unit is available to transport a maximum of seven (7) of the Contractor's personnel (subject to D11 and D20) to and from the Work area at Mile 82.44 (approximately 8 kilometres east of East Braintree, Manitoba) at no cost to the Contractor. Only one (1) track car unit is permitted to be used at any given time for the purposes of transporting the Contractor's personnel.
 - (ii) Transportation of the Contractor's personnel will be provided such that there is no interference with GWWD staff duties during normal working hours (0800 to 1630 hours, Monday to Friday).

E4.4 SLAIF Staffhouse Accommodations

E4.4.1 General

- (a) Accommodations are available, at no cost to the Contractor, in the staffhouse or one (1) of the residences located at the SLAIF at Indian Bay (Shoal Lake). The SLAIF and staffhouse are located approximately 150 kilometres from Winnipeg, Manitoba and are only accessible by rail. The nearest highway contact with the rail line is approximately 24 kilometres (thirty to forty (30-40) minutes) from the facility. There are no medical services available. Portions of the facility available to the Contractor and Subcontractors include sleeping quarters, dining room, recreation area, and washroom/shower facilities.
- (b) The City will provide, at no cost to the Contractor, accommodations in the staffhouse for up to eight (8) Contractor personnel and, if required, arrangements can be made for short-term accommodations in City employee designated areas of the staffhouse.
 - (i) The Contractor shall not have unlimited or exclusive use of the staffhouse and residence.
 - (ii) The staffhouse and residence may be used to accommodate City or other contract personnel in addition to the Contractor's personnel.
 - (iii) The City reserves the right to reassign Contractor room allocations within the staffhouse and residences to accommodate other personnel as required.
- (c) The Contractor shall be responsible for all food, meal preparation, and housekeeping associated with the use of the staffhouse and any residence being used by the Contractor. Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information) includes the housekeeping requirements for the staffhouse and residences.
- (d) The City will provide, at no cost to the Contractor, toilet paper, paper towels, and bedding.
- (e) The Contractor shall provide all cleaning supplies for use in the staffhouse and residence.
- (f) The Contractor will be responsible for all other personal incidentals including towels, soap, shampoo, toothpaste, toothbrushes, laundry detergent, etc.

- (g) A safety orientation will be provided by the intake foreman in accordance with Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information).

E4.4.2 Operation of Staffhouse and Residences at Indian Bay – Person in Charge

- (a) If arrangements are made for personnel to stay at the staffhouse or residence at Indian Bay, the Contractor shall designate a “person in charge”. This person shall ensure that all Contractor’s personnel follow all staffhouse, residence, and GWWD Railway requirements in effect for the duration of the Contract. As soon as the “person in charge” becomes aware of a breach in requirements or is informed of same by railway or intake staff, the “person in charge” shall immediately rectify the condition.
- (b) The “person in charge” shall clearly instruct the group as to the requirements in place and note that failure to follow the rules may result in ejection from the premises. Failure by the “person in charge” to enforce these requirements may also result in ejection from the premises. The requirements in effect at this time are attached in Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information) for reference and are posted in the staffhouse and residence.
 - (i) Alcoholic beverages and other intoxicating substances are not to be consumed or carried outside the staffhouse or residences. Intoxication on City of Winnipeg property is prohibited at all times.
- (c) The “person in charge” is responsible for responding to any medical emergency which affects a member of the group. Personnel are required to complete the personal information and waiver form (Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information) indicating any medical condition which may be of concern and should be retained by the “person in charge”.

E4.4.3 SLAIF Hours of Operation

- (a) The standard hours of operations for the SLAIF at Indian Bay are 0800 hours to 1630 hours, Monday to Friday.

E4.5 Measurement and Payment

- E4.5.1 Access and security is considered incidental to “Mobilization / Demobilization” and no additional measurement or payment will be made.

E5. RESTRICTIONS

E5.1 General

- E5.1.1 The RDS is a critical piece of the City’s infrastructure and the Contractor is subject to a number of key restrictions to protect the safety and integrity of the RDS.

- E5.1.2 It is recognized that some select Work tasks will have reduced or no impact to City operations or Trades and Operation Staff. For the purposes of the restrictions and critical stages only, the following are considered to be excluded (do not have any restrictions and do not impact critical stages):

- (a) Work completed at the Contractor’s facility (e.g. programming, FAT, etc.);
- (b) mobilization and demobilization;
- (c) installation of cable trays;
- (d) installation of minor instrumentation (e.g. flood switches, pressure transmitters);
 - (i) note, no testing or tie-ins for the minor instrumentation will be permitted as PLC and/or Station Master PLC shutdowns are required;
- (e) modification to or installation of UPS panels; and
- (f) installation and testing of the communication network (e.g. cabling, hardware, switches).

E5.2 Work Sequencing

- E5.2.1 The Work may only occur at one (1) facility at a time.
- E5.2.2 Notwithstanding E5.2.1, RDS/WTP SCADA integration must be done first and must be done concurrently with the TBPS.
- E5.2.3 Work at the McPhillips RPS must occur prior to the MacLean RPS and Hurst RPS.
- E5.2.4 Notwithstanding E5.2.1, the DBPS and DCFF facilities must be done last and must be done together.

E5.3 Work Duration

- E5.3.1 The permitted duration for the Work at each facility, subject to E5.1.2, is as follows:
 - (a) RDS/WTP SCADA Integration – eight (8) weeks;
 - (i) For clarity, this duration is only for the initial installation for the RDS/WTP SCADA integration. The inclusion (i.e. programming, testing, etc.) of subsequent facilities will not be subject to this Work duration requirement. This does not relieve the Contractor of their obligations to coordinate with the City pursuant to E8 and the Commissioning Plan;
 - (b) TBPS – eight (8) weeks;
 - (c) SLAIF – twelve (12) weeks;
 - (d) McPhillips RPS – fourteen (14) weeks;
 - (e) MacLean RPS – fourteen (14) weeks;
 - (f) Hurst RPS – fourteen (14) weeks; and
 - (g) DBPS and DCFF – fourteen (14) weeks.

E5.4 RDS/WTP SCADA Integration

- E5.4.1 Due to the nature of the commissioning process for the RDS/WTP SCADA integration, the only restriction is that commissioning does not impact the uninhibited operation of the other RDS facilities. For clarity, the commissioning requirements as set out in E8 still apply.

E5.5 TBPS

- E5.5.1 The surge tower can be off-line for a maximum of two (2) days without alternative level monitoring.
- E5.5.2 The Contractor is to provide the City with alternative means to undertake level monitoring in the event that the surge tower/data link is off-line for more than two (2) days. Alternative level monitoring shall be limited to a maximum of six (6) weeks.
- E5.5.3 There are only two (2) PLC processors (hot-standby PLC pair) at the TBPS. There are no pump or Station Master PLC restrictions and the facility is permitted to go offline for the duration of the Work at the TBPS, subject to E5.3.1(b).

E5.6 SLAIF

- E5.6.1 There are eleven (11) PLCs that can be commissioned in any order and the number of PLCs that can be worked on at any one time is not restricted.
- E5.6.2 The permitted duration for the commissioning (i.e. unavailable for uninhibited City use) of any PLC system shall be two (2) weeks.
- E5.6.3 Notwithstanding E5.6.1, the Work is restricted to one low lift pump PLC at a time.
- E5.6.4 In the occurrence of a low lift event, Work will be suspended and the critical stage shall be extended.

E5.7 McPhillips RPS, MacLean RPS, and Hurst RPS

E5.7.1 The permitted duration for the commissioning (i.e. unavailable for uninhibited City use) of a pump PLC shall be three (3) weeks. Only one (1) pump may be unavailable at a time.

E5.7.2 All pumps shall be commissioned prior to the commissioning of the Station Master PLC.

E5.7.3 Station Master PLC

- (a) Commencement of a shutdown for commissioning of the Station Master PLC shall commence at 23:00.
- (b) The Contractor shall have all new PLC hardware and programming installed by 05:00 the following morning (i.e. six (6) hours duration). The Station Master PLC must be able to be monitored (but not controlled) by the new RDS/WTP SCADA system and must be able to be locally controlled by the City Trades and Operation Staff.
- (c) The Contractor shall have all commissioning completed, including testing and confirmation of all devices, within forty-eight (48) hours following the installation of the new PLC hardware and programming (i.e. fifty-four (54) hours from the initial 23:00 start time for commissioning).
 - (i) For clarity, the Contractor should be aware that the City will be required to manually operate the facility (e.g. pumps, chlorination system, etc.) during this commissioning period to facilitate the Contractor's Work. The amount of time being granted is based on a reasonable expectations of the Contractor's forces. However, due to the impact to City staff and operations, it is requested that the Contractor minimize this commissioning period, where possible.
- (d) Only one (1) shutdown will be permitted per week.

E5.8 DBPS and DCFF

E5.8.1 The permitted duration for the commissioning (i.e. unavailable for uninhibited City use) of a pump PLC shall be three (3) weeks. Only one (1) pump may be unavailable at a time.

E5.8.2 All pumps shall be commissioned prior to the commissioning of the Station Master PLC.

E5.8.3 Station Master PLC

- (a) Commencement of a shutdown for commissioning of the Station Master PLC shall commence at 06:00.
- (b) The Contractor shall have all new PLC hardware and programming installed by 18:00 (i.e. twelve (12) hours duration), must be able to be monitored (but not controlled) by the new RDS/WTP SCADA system, and must be able to be locally controlled by the City Trades and Operation Staff.
 - (i) For clarity, shutdowns shall not exceed twelve (12) hours due to significant risk to the City in exceeding this timeframe. The DBPS supplies all of the three (3) RPSs with treated water. It is therefore a singular crucial piece of the overall water supply system.
- (c) The Contractor is expected to have all commissioning completed, including testing and confirmation of all devices, within eighteen (18) hours following the installation of the new PLC hardware and programming (i.e. thirty (30) hours from the initial 06:00 start time for commissioning).
 - (i) For clarity, the Contractor should be aware that the City will be required to manually operate the facility (e.g. pumps, etc.) during this commissioning period to facilitate the Contractor's Work. The amount of time being granted is based on a reasonable expectations of the Contractor's forces. However, due to the impact to City staff and operations, it is requested that the Contractor minimize this commissioning period, where possible.
- (d) A minimum of ten (10) Calendar Days must be provided in between shutdowns.

E5.9 Measurement and Payment

E5.9.1 Restrictions are considered incidental to the Work and no measurement or payment will be made.

E6. WORK PLAN

E6.1 The RDS is a critical piece of the City's infrastructure and the Contractor is subject to enhanced reporting requirements to allow the City to effectively facilitate the Work and ultimately to protect the safety and integrity of the RDS.

E6.2 Submit a detailed Work Plan in accordance with Section 01 33 00 – Submittal Procedures in the NMS for review and approval by the Contract Administrator. The Work Plan is to be updated on each Thursday by noon including the following:

- (a) upcoming and outstanding Submittals;
- (b) updated Work schedule adhering to the requirements of the detailed work schedule (refer to D14);
- (c) upcoming City forces (Trades and Operations Staff) involvement required within the next four (4) weeks;
- (d) upcoming coordination related to work by others within the next four (4) weeks (refer to D21);
- (e) any changes to the SLAIF/GWWD Railway schedule within the next four (4) weeks (refer to E4.3);
- (f) planned FAT within the next four (4) weeks (refer to E9);
- (g) planned shutdowns and/or commissioning within the next four (4) weeks (refer to E10);
- (h) planned training within the next four (4) weeks (refer to E11);
- (i) upcoming ground disturbances at the SLAIF Site within the next two (2) weeks (refer to E14).
- (j) upon request, detailed description of select Work activities planned for the upcoming week(s), including, but not limited to:
 - (i) mobilization, demobilization, and security;
 - (ii) the proposed construction sequence to be followed including all methods to be employed to ensure that no damage or unintended pump shutdowns occur;
 - (iii) a description of all proposed methods of construction to be implemented; and
 - (iv) specialized equipment that may be used;
- (k) any design revisions proposed to accommodate the Contractor's proposed method of construction;
- (l) upcoming demolition, cutting, or alteration (refer to Section 01 73 00 – Execution and Section 26 05 05 – Selective Demolition for Electrical in the NMS); and
- (m) upcoming and completed asbestos work, removal/disposal plan, and waste disposal confirmation (refer to E2, Section 02 82 00.01 – Asbestos Abatement – Minimum Precautions and Section 02 82 00.02 – Asbestos Abatement – Intermediate Precautions in the NMS).

E6.3 No Work shall proceed without the inclusion of the work on a detailed Work Plan and corresponding approval of the Work by the Contract Administrator.

E6.4 Measurement and Payment

E6.4.1 Work Plan is considered incidental to the Work and no measurement or payment will be made.

E7. REFERENCE SUMMARY INFORMATION

- E7.1 The following documents have been prepared to provide a summary of the major equipment and Submittals, respectively, noted throughout the Contract Documents:
- (a) Appendix A – Major Equipment List; and
 - (b) Appendix B – Submittal List.
- E7.2 These appendices have been provided for informational purposes only for the convenience of the Bidder and/or Contractor. The Contractor shall be responsible to conform to the requirements of the Contract Documents. In the case of a discrepancy between these appendices and the Contract Documents, the Contract Documents shall govern.

E8. FUNCTIONAL REQUIREMENTS SPECIFICATION

- E8.1 General
- E8.1.1 The purpose of the Functional Requirement Specification is to fully describe the programming and configuration to be performed.
- E8.1.2 The Functional Requirement Specification shall be used for programming and configuration of the system and used during the FAT and commissioning process for verification of facility operation.
- E8.1.3 The Functional Requirement Specification shall include all requirements provided in the Appendix C – Process Control Narrative and NMS Division 29 – Instrumentation and Control.
- E8.1.4 The Functional Requirement Specification is intended to be a living document and updated as the Work progresses.
- E8.1.5 The Functional Requirement Specification shall at a minimum:
- (a) detail the configuration and programming of the Works in sufficient detail as to fully convey the standards that will be utilized.
 - (b) provide complete details in the configuration of all software settings, IP addresses, user names, and security information.
 - (c) Provide sufficient information to fully support all Work by the City including creation of new servers, upgrading of operating systems, management of the high availability and DR systems, addition of users and groups, modification of equipment operation, addition of new equipment, changing of alarm functions, modification of graphics, etc.
 - (d) comprise a combination of pdf documents and electronic files in their native digital format.
 - (e) be inclusive of all facilities and Work and be organized as follows:
 - (i) table of contents;
 - (ii) revision control;
 - (iii) abbreviations;
 - (iv) general introduction;
 - (v) SCADA servers and virtualization as described in E8.3;
 - (vi) SCADA system as described in E8.4;
 - (vii) PLC systems as described in E8.5;
 - ◆ Tache BPS;
 - ◆ SLAIF;
 - ◆ McPhillips RPS;
 - ◆ Maclean RPS;
 - ◆ Hurst RPS; and

- ◆ DBPS and DCFF;
 - (viii) PMCM as described in E8.6;
 - (ix) MPR as described in E8.7; and
 - (x) power meters as described in E8.8.
- E8.1.6 The Contractor shall undertake Functional Requirements Specification works utilizing the individuals qualified as set out in B13.4.
- E8.2 Submittals
- E8.2.1 Provide Submittals in accordance with Section 01 33 00 – Submittal Procedures in the NMS.
- E8.2.2 Submit a Functional Requirement Specification in accordance with E8.1.5 to the Contract Administrator for review and approval prior to the commencement of programming. Provide a four (4) week review period for the Contract Administrator.
- E8.2.3 At a minimum, the Functional Requirement Specification shall be updated and resubmitted for review by the Contract Administrator at the following events:
- (a) as part of the draft O&M Manual submission after each facility closeout (refer to E13.1.3(d)); and
 - (b) as part of the final O&M Manual submission prior to Substantial Performance (refer to E13.2.1(c)(i)).
- E8.3 SCADA System Servers and Virtualization
- (a) Provide hardware specification details including the number of CPU cores and RAM, and Ethernet cards for the physical server equipment, which includes:
 - (i) three (3) production vSphere ESXi Host servers;
 - (ii) one (1) DR vSphere ESXi Host server;
 - (iii) one (1) Veeam Backup Proxy server; and
 - (iv) one (1) SAN storage device.
 - (b) Provide virtualized server configuration and software.
 - (i) For each virtualized server identified in Appendix C – Process Control Narrative, a listing of all software installed on the SCADA System Servers. Include the following:
 - ◆ server name;
 - ◆ IP Address;
 - ◆ operating system version;
 - ◆ virtualization software version;
 - ◆ backup software;
 - ◆ software licensing; and
 - ◆ resource allocation (memory, CPU cores, hard drive capacity, Ethernet cards).
 - (c) Provide details on the security setting for the servers which will include:
 - (i) group names;
 - (ii) group access;
 - (iii) user names; and
 - (iv) passwords.
 - (d) Provide details on the setup of the high availability cluster, DR, and failover configuration parameters including:
 - (i) RTO;
 - (ii) RPO;

- (iii) schedule of differential and full backup; and
- (iv) files and database listing included in the backup.

E8.4 SCADA System

- (a) For each SCADA system server, provide a detailed listing of all installed SCADA software and licensing, complete with version numbers.
- (b) Provide details on the configuration of the integrated SCADA system security model including:
 - (i) user names;
 - (ii) groups; and
 - (iii) access level (full development, deploy only, read only, and read/write).
- (c) Provide details on the RDS SCADA system programming.
 - (i) Provide details on all SCADA object templates used in the SCADA system. Details shall include:
 - ◆ object template name;
 - ◆ inheritance tree;
 - ◆ UDAs;
 - ◆ alarms;
 - ◆ historization;
 - ◆ scripts
 - ◆ graphic symbols and faceplates; and
 - ◆ PLC I/O assignments.
 - (ii) Provide a complete list of system areas used in the SCADA system.
 - (iii) Provide a complete list and details of the object instances used in the SCADA system. Details shall include:
 - ◆ equipment tag name;
 - ◆ object template; and
 - ◆ deployed area.
 - (iv) Provide a complete list of OI Servers and configuration details used in the SCADA system. Details shall include:
 - ◆ OI Server name and version;
 - ◆ Topic names; and
 - ◆ IP addresses.
 - (v) Provide details on the configuration of the RDS SCADA system communication redundancy including the following:
 - ◆ primary communication topic name;
 - ◆ backup communication topic name; and
 - ◆ description of custom scripting to provide automatic failover from primary communications path to all backup communications paths.
 - (vi) Provide details on the configuration of the integrated SCADA system redundancy including the following:
 - ◆ primary platform deployment node;
 - ◆ redundant platform deployment node; and
 - ◆ description of custom scripting required to reconcile, store and forward historical data with primary historical data during live/live redundancy failure mode.
 - (vii) Provide details on the configuration of the integrated SCADA system historian including the following:

- ◆ historian database name;
 - ◆ database security user names and passwords; and
 - ◆ data replication method.
- (viii) Provide details on the configuration of the SCADA system communication to the City Business Network including the following:
- ◆ security configuration.
- (ix) Provide a complete list of RDS SCADA system graphics including:
- ◆ alarm banner;
 - ◆ navigation bar;
 - ◆ graphics window;
 - ◆ equipment symbols;
 - ◆ equipment faceplates;
 - ◆ communications status; and
 - ◆ PLC I/O network status.
- (x) Provide a native electronic version of items (i) through (viii) for the integrated SCADA system in *.aapkg file.

E8.5 PLC Systems

- (a) Provide a complete list of the PLC hardware and include the following:
- (i) RDS PLC processor names;
 - (ii) facility name;
 - (iii) control panel name;
 - (iv) IP addresses;
 - (v) physical I/O lists:
 - ◆ tag name;
 - ◆ type (DI, DO, AI, AO);
 - ◆ rack/Slot/Point; and
 - ◆ alarm set points (LLA, LA, HA, HHA);
 - (vi) virtual I/O lists:
 - ◆ device name;
 - ◆ device IP address;
 - ◆ tag name;
 - ◆ type (DI, DO, AI, AO); and
 - ◆ alarm set points (LLA, LA, HA, HHA).
- (b) Provide a complete list of the PLC software and include the following:
- (i) Provide a description of the control philosophy for each type of equipment including:
 - ◆ fixed speed electric pumps;
 - ◆ variable speed electric pumps;
 - ◆ gas engine pumps;
 - ◆ open/close valves;
 - ◆ modulating valves;
 - ◆ local equipment control;
 - ◆ remote manual equipment control;
 - ◆ automatic equipment control;
 - ◆ under voltage pump ride-through;
 - ◆ power failure; and

- ◆ interlocks associated with equipment operation.
- (ii) Provide logic diagrams for each type of pump for the following sequences:
 - ◆ pump start-up;
 - ◆ pump normal controlled shut-down;
 - ◆ pump fast controlled shut-down; and
 - ◆ pump immediate shut-down.
- (iii) Provide a complete mapping of PLC variables to SCADA system tag names for each type of equipment.
- (iv) Provide a complete list of alarm conditions for each type of equipment and include the following data:
 - ◆ equipment tag name;
 - ◆ alarm condition;
 - ◆ alarm priority; and
 - ◆ alarm type (self-resetting, latched remote reset, latched local reset).
- (v) Provide details on the signal processing for the following input types:
 - ◆ analogue input smoothing; and
 - ◆ discrete input de-bounce.
- (vi) Provide details on the following control loops:
 - ◆ general PID;
 - ◆ pump speed PID control; and
 - ◆ chlorine dosing control.
- (vii) Provide a list of user defined data types complete with definition and include the following information:
 - ◆ data type name;
 - ◆ data type structure;
 - ◆ usage; and
 - ◆ an electronic PLC programming native file
- (viii) Provide a list of user defined function blocks complete with definition and include the following information:
 - ◆ function block name;
 - ◆ block inputs and input type definition;
 - ◆ block outputs and output type definition; and
 - ◆ an electronic PLC programming native file.
- (ix) Provide a list of totalizers complete with:
 - ◆ equipment/instrument name;
 - ◆ value to be totalized;
 - ◆ totalized units; and
 - ◆ reset conditions.

E8.6 PMCM System

- (a) Provide a list of all PMCM systems and include the following:
 - (i) PMCM name;
 - (ii) facility name;
 - (iii) control panel name;
 - (iv) channel configuration and scaling;
 - (v) alarm set points; and
 - (vi) IP address.

E8.7 MPR

- (a) Provide a list of all MPR and include the following:
- (i) MPR name;
 - (ii) facility name;
 - (iii) configuration and scaling;
 - (iv) protection set points;
 - (v) parameters to be read by the SCADA system; and
 - (vi) IP address.

E8.8 Power Meters

- (a) Provide a list of all power meters and include the following:
- (i) power meter name;
 - (ii) facility name;
 - (iii) configuration and scaling;
 - (iv) alarm set points;
 - (v) parameters to be read by the SCADA system; and
 - (vi) IP address.

E8.9 Measurement and Payment

- E8.9.1 Functional Requirements Specification will not be measured and will be paid for at the Contract lump sum prices by facility for "Programming, Configuration, and FAT" for supplying all materials and performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E9. FAT

E9.1 General

- E9.1.1 FAT is a critical task in the completion of the Work for the upgrade of the RDS SCADA system upgrade, PLC replacement, and power reliability upgrades. The FAT shall be used to verify correct operation of the Work on a facility by facility basis. Each facility shall be tested as a complete unit with all Work components configured and connected as it will be once installation is performed. FAT will be required for all Work components including:

- (a) PLC Systems as described in E9.7;
- (b) SCADA System Servers as described in E9.8;
- (c) SAN Storage as described in E9.9;
- (d) SCADA System as described in E9.10;
- (e) MPRs as described in E9.11;
- (f) Power meters as described in E9.12;
- (g) PMCM System as described in E9.13; and
- (h) HMIs as described in E9.14.

- E9.1.2 The FAT of the components shall be performed prior to installation, start-up, and commissioning. The FAT shall provide verification that the components and programming operate in accordance with the Functional Requirements Specification as set out in E8, Specifications, and Appendix C – Process Control Narrative. The goals of the FAT are to:

- (a) identify control system issues prior to Site installation;
- (b) test the ability of the system to operate error free;
- (c) test the ability of the system to respond to process failures;

- (d) test the ability of the system to respond to communication network failures; and
- (e) test the ability of the system to respond to server hardware and software failures.

E9.1.3 Deviations or abnormalities observed during testing shall be documented in the FAT completion certificates and corrected prior to shipment.

E9.1.4 It is anticipated that multiple FAT will be required over the duration of the Work and, at a minimum, shall be completed for each facility.

E9.1.5 FAT requiring the City or Contract Administrator's presence shall be scheduled and coordinated to not interfere with commissioning or training activities.

E9.1.6 The Contractor shall undertake FAT works utilizing the individuals qualified as set out in B13.4.

E9.2 Submittals

E9.2.1 Provide Submittals in accordance with Section 01 33 00 – Submittal Procedures in the NMS.

E9.2.2 Submit a separate FAT Plan for each facility and component of the Work in accordance with E9.3 at least six (6) weeks prior to the scheduled FAT.

- (a) Following the provision of the FAT Plan, the Contract Administrator will identify the personnel who will be attending from the City (i.e. City representative, Trades and Operation Staff, etc.) and Contract Administrator. The Contract Administrator's review of the FAT Plan in accordance with Section 01 33 00 – Submittal Procedures in the NMS may incorporate reasonable instructions to modify the FAT Plan to accommodate the required personnel.

E9.2.3 Submit FAT completion certificates in accordance with E9.4 within two (2) weeks of the successful conclusion of a FAT.

E9.2.4 Submit the facility simulation system software in electronic format in accordance with E9.6 within two (2) weeks of Substantial Performance.

E9.3 FAT Plan

E9.3.1 The FAT Plan shall incorporate the requirements of E9.1 and shall, at a minimum, include the following:

- (a) description of the Work component;
- (b) time and dates of testing and schedule of activities;
- (c) testing location;
- (d) required Contractor personnel;
- (e) testing equipment required;
- (f) equipment check lists;
- (g) functional test lists; and
- (h) sign-off sheet.

E9.3.2 The Contractor shall perform additional equipment and functional tests not listed in the FAT Plan but requested by the Contract Administrator or the City prior to and during each FAT at no additional cost.

E9.4 FAT Completion Certificate

E9.4.1 The certificate shall document the following:

- (a) description of the Work component;
- (b) date and times of testing;
- (c) testing location;

- (d) personnel present;
- (e) tests conducted;
- (f) test outcomes;
- (g) corrective action performed;
- (h) outstanding deficiencies; and
- (i) sign-off sheet.

E9.5 Testing Facilities

E9.5.1 The FAT shall be conducted in facilities provided by the Contractor. The facilities shall have adequate space to accommodate the FAT team members. The Contractor shall allow for two (2) Contract Administrator personnel and four (4) City personnel to witness the FAT.

E9.5.2 It is preferred that the FAT be conducted in Winnipeg, Manitoba. The Contractor shall pay all travel expenses for the Contract Administrator and City personnel should the FAT be conducted outside of Winnipeg; expenses would include:

- (a) travel time;
- (b) airfare;
- (c) car rental and/or taxis;
- (d) hotel;
- (e) meals;
- (f) parking; and
- (g) miscellaneous expenses.

E9.6 Facility Simulation System

E9.6.1 Simulation systems shall be developed by the Contractor for use in the performance of the FAT. The simulation systems shall utilize a combination of hardware and software logic to emulate the facilities' equipment and systems. The actual site PLC, PLC control logic, SCADA equipment, and SCADA configuration shall be used in the simulation testing process.

E9.6.2 To facilitate the FAT of the PLC control logic, the new PLC programs shall be structured such that all discrete and analogue inputs are buffered to internal variables for use throughout the program. During simulation testing, the movement of physical input status to the internal variables shall be disabled. The simulation system shall monitor the PLC system outputs and shall then write to the internal input variables thereby simulating the facility's equipment operation. The simulated RDS model shall include a set of mathematical equations and logical relationships that represent how the RDS's outputs react to its inputs. The simulator control logic to emulate I/O feedback shall be programmed in either an HMI or a separate simulator PLC.

E9.6.3 The entire RDS system including the UV system interface signals shall be modeled within the simulation system. Once the RDS model has been developed, verified, and programmed into the simulator, the Contractor shall create entire scenarios in the simulated RDS and verify correct control system response.

E9.6.4 The simulation system shall include an HMI which displays all PLC I/O states and values and provides an interface for simulating equipment including manipulating the PLC input states and values.

E9.6.5 Control panel emulation shall be accomplished using the simulator's HMI with graphical screens configured to match the pump control panel devices including push buttons, selector switches, variable control dials, indicating lamps, and indicating devices. The simulation system's HMI shall provide the ability to activate all alarms and failure modes of the facility's equipment. This shall include scenarios such as:

- (a) pump failed to start;
- (b) pump overload tripped;
- (c) pump reverse spin;
- (d) pump and motor vibration/temperature alarm;
- (e) pump and motor vibration/temperature trip;
- (f) valve fail to open;
- (g) facility flood alarm;
- (h) distribution low pressure;
- (i) pump speed; and
- (j) power outage.

E9.7 PLC Systems

E9.7.1 It is required that all PLC hardware and PLC programs undergo FAT prior to hardware installation. Each facility shall be tested as a whole with all PLCs within each facility connected and programmed. The facilities and PLC systems are as follows:

- (a) TBPS
 - (i) PLC-M800-1 and PLC-M800-2
 - ◆ RIO-M800
- (b) SLAIF
 - (i) PLC-P015-1 and PLC-P015-2
 - ◆ RIO-P015
 - ◆ RIO-P017
 - ◆ RIO-P030
 - ◆ RIO-A040
 - ◆ RIO-C041
 - ◆ RIO-D042
 - ◆ RIO-P043-1
 - ◆ RIO-P043-2
 - ◆ RIO-P802
- (c) McPhillips RPS
 - (i) PLC-M800-1 and PLC-M800-2
 - ◆ RIO-M800-A
 - ◆ RIO-M800-D
 - (ii) PLC-M001
 - (iii) PLC-M002
 - (iv) PLC-M003
 - (v) PLC-M004
 - (vi) PLC-M005
 - (vii) PLC-M006
- (d) Maclean RPS
 - (i) PLC-M800-1 and PLC-M800-2
 - ◆ RIO-M800-A
 - ◆ RIO-M800-D
 - (ii) PLC-M021
 - (iii) PLC-M022

- (iv) PLC-M023
- (v) PLC-M025
- (vi) PLC-M026
- (e) Hurst RPS
 - (i) PLC-M800-1 and PLC-M800-2
 - ◆ RIO-M800-A
 - ◆ RIO-M800-D
 - (ii) PLC-M011
 - (iii) PLC-M012
 - (iv) PLC-M014
 - (v) PLC-M015
 - (vi) PLC-M016
 - (vii) PLC-M017
- (f) DBPS/DCFF
 - (i) PLC-D021-1 and PLC-D021-2
 - ◆ RIO-D021
 - ◆ RIO-D011
 - ◆ RIO-D012
 - ◆ RIO-D800-A
 - ◆ RIO-D800-D
 - ◆ RIO-Z800
 - (ii) PLC-D003
 - (iii) PLC-D004
 - (iv) PLC-D005

E9.7.2 Each facility's PLC hardware and network systems shall be connected and operational prior to FAT. Prior to FAT, ensure the following is completed:

- (a) Network cabling
 - (i) All communication cables used for the FAT shall be tested using test equipment and methods as outlined in the Specifications. Communication cables which fail testing shall be replaced prior to proceeding with FAT.
- (b) Hardware
 - (i) All hardware shall be securely installed. PLC racks shall be fastened to a suitable support structure such as a metal or plywood backboard.
 - (ii) Din rail hardware shall be provided for mounting of all din rail mounted equipment.
 - (iii) All network and power cabling shall be installed in PVC wire duct.
 - (iv) Individual circuit breakers for 120 VAC power supply to all hardware shall be provided.
- (c) PLC Configuration
 - (i) Configure all PLC equipment with the correct parameters for power supplies, CPUs, rack size, I/O modules, and IP addressing.

E9.7.3 The hardware requiring FAT includes:

- (a) PLC I/O Modules
 - (i) Perform I/O testing on all PLC I/O as follows:
 - ◆ apply input voltage to each discrete point and confirm PLC value;
 - ◆ energize each discrete output and measure contact closure;

- ◆ apply 4-20 mA input to each analogue point. Record PLC values at 4, 12, and 20 mA; and
- ◆ energize each analogue output and record mA output for zero percent (0%), fifty percent (50%), and one hundred percent (100%) range.

E9.7.4 Functional testing shall be conducted to verify PLC control logic for the correct operation of the equipment and systems. The functional testing shall utilize the facility simulator system and be conducted to confirm correct equipment operation and response to both normal and abnormal conditions. Using the Functional Requirements Specification described in E8 and Appendix C – Process Control Narrative documents as a basis, test all control functionality and process alarm conditions. In particular test the following:

- (a) operate each piece of equipment and system in local manual control and verify correct PLC control and SCADA system operation;
- (b) operate each piece of equipment and system in remote manual control and verify correct PLC control and SCADA system operation;
- (c) operate each piece of equipment and system in automatic control and verify correct PLC control and SCADA system operation;
- (d) operate each piece of equipment in automatic mode and switch to remote manual control and confirm bumpless transition;
- (e) operate each piece of equipment in local manual control and switch to automatic control and confirm bumpless transition;
- (f) operate each piece of equipment in remote manual control and switch to automatic control and confirm bumpless transition;
- (g) modulate the distribution system pressure signal and confirm correct pump start-up, speed control, and shutdown process;
- (h) modulate the distribution flow and residual chlorine level signals and confirm correct operation of chlorine dose control;
- (i) test pump start up sequence failure and confirm correct response;
- (j) test pump suction and discharge valve failures;
- (k) test UV systems failure and confirm correct response;
- (l) test utility power supply failure and power supply return to normal;
- (m) test station flood switch response;
- (n) test all equipment interlocks;
- (o) test all equipment alarm conditions;
- (p) test PLC to PLC communications;
- (q) test failure of the PLC communications network at each point in the network and verify correct failure to redundant communications path and alarm notification;
- (r) test failure of the PLC I/O network;
- (s) test failure of the Station Master PLC processors for redundant failure and return to normal; and
- (t) test PLC program download and verify uninterrupted PLC control via redundant PLC processor.

E9.8 SCADA System Servers

E9.8.1 The FAT of the new SCADA system servers shall include testing of the server hardware and software. The SCADA system server components shall be deployed on individual VM with multiple VMs hosted on individual servers. The virtual infrastructure will consist of the following components:

- (a) one (1) vSphere virtual center server virtual appliance;

- (i) The vSphere virtual center server virtual appliance shall manage the configuration of services including:
 - ◆ vMotion;
 - ◆ vSphere high availability;
 - ◆ DRS;
 - ◆ DPM;
 - ◆ vSphere Symmetric Multiprocessor Fault Tolerance (vSphere FT); and
 - ◆ Update Manager.
- (b) three (3) production vSphere ESXi enterprise hosts;
- (c) one (1) DR vSphere ESXi enterprise host; and
- (d) one (1) vRealize Operations Manager Virtual appliance.

E9.8.2 FAT of the infrastructure listed in E9.8.1 is required. All server hardware shall be tested as a complete system including the following:

- (a) Conduct an offline diagnostic test of the server computer hardware for the following:
 - (i) memory fault testing;
 - (ii) network interface cards testing;
 - (iii) CPU;
 - (iv) power supply;
 - (v) video graphics card;
 - (vi) USB; and
 - (vii) BIOS.

E9.8.3 Functional testing shall be conducted to verify correct equipment operation and response to both normal and abnormal conditions using the facility simulation system. Using the Functional Requirements Specification described in E8 and Appendix C – Process Control Narrative documents as a basis, test all control functionality and process alarm conditions. In particular test the following:

- (a) server component software including management of the virtualized environment and the host operating systems:
 - (i) ESXi hosts log in;
 - (ii) confirm IP address;
 - (iii) assign VLAN ID; and
 - (iv) specify host name and DNS server;
- (b) ESXi host management network including:
 - (i) confirm ping the subnet gateway specified;
 - (ii) confirm ping the primary DNS server specified;
 - (iii) confirm ping the alternate DNS server specified; and
 - (iv) confirm resolve of the hostname of the ESXi host;
- (c) operation of the vCenter server including:
 - (i) create a VM;
 - (ii) modify the VM RAM, CPU, and network interface cards;
 - (iii) delete the VM;
 - (iv) deploy a VM; and
 - (v) restart a VM;
- (d) operation of the vMotion cluster functions which include the high availability and DRS. Tests to include:
 - (i) migrate a server to a new host and confirm no interruption to the VM;
 - (ii) migrate server back to original host and confirm no interruption to the VM;

- (iii) put ESXi host into maintenance mode and confirm the all servers are migrated to a different host;
 - (iv) run the DRS tool and confirm migration recommendations to an underutilized host;
 - (v) confirm synchronization between high availability cluster and DR;
 - (vi) power off each physical ESXi host and confirm failover; and
 - (vii) power off all three (3) ESXi high availability hosts and confirm failover to DR;
- (e) operation of the Veeam backup and replication software including the following built-in tests:
- (i) heartbeat test;
 - (ii) ping test; and
 - (iii) application test.

E9.9 SAN Storage

E9.9.1 The SAN storage is the dedicated storage for the high availability cluster as these servers have no onboard storage. Consequently, functional testing of the SAN storage shall be conducted in conjunction with the high availability cluster. In particular, test the following:

- (a) confirm IP address;
- (b) confirm redundancy between drives; and
- (c) power off SAN storage and confirm failover to DR.

E9.10 SCADA System

E9.10.1 The SCADA system has been designed with several components/systems that require FAT. All SCADA servers shall be preconfigured and deployed to the VMware high availability cluster. This includes the following:

- (a) VM01 – AD DNS as described in E9.10.2;
- (b) VM02 – AD DNS 02 as described in E9.10.2;
- (c) VM03 – AD DNS 03 as described in E9.10.2;
- (d) VM04 – Galaxy Repository as described in E9.10.3;
- (e) VM05 – Wonderware Application Object Server 1 as described in E9.10.4;
- (f) VM06 – Wonderware Application Object Server 2 as described in E9.10.4;
- (g) VM07 – InTouch for Terminal Services (TS1), Rockwell Thin Manager, InTouch Access Anywhere as described in E9.10.5;
- (h) VM08 – InTouch for Terminal Services (TS2), Rockwell Thin Manager, InTouch Access Anywhere as described in E9.10.5;
- (i) VM09 – Wonderware Historian as described in E9.10.6;
- (j) VM10 – InTouch Access Anywhere Secure Gateway as described in E9.10.7;
- (k) VM11 – Vcentre Server Virtual Appliance as described in E9.10.8; and
- (l) VM12 – VEEAM Backup Proxy as described in E9.10.9; and
- (m) VM13 – Wonderware Tier-2 Historian and On-Premise Insight as described in E9.10.10.

E9.10.2 For the VM01, VM02, and VM03 - AD DNS, AD DNS 02, and AD DNS 03, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) confirm DNS server is functional;
- (c) verify IP addresses, computer names, and domain;
- (d) verify all computer names on the network resolve to IP addresses;

- (e) verify active directory credentials user PowerShell confirm all user names and passwords are valid;
- (f) add a new user and confirm login on secondary computer which is part of the domain;
- (g) change user's rights to administrator and confirm with login on secondary computer;
- (h) delete user and confirm with login failure on secondary computer;
- (i) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (j) verify time synchronization.

E9.10.3 For the VM04-Galaxy Repository, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP address, computer name, and domain;
- (c) confirm Galaxy login credentials for multiple users;
- (d) create a new user and confirm successful login;
- (e) confirm backup and restoration of the galaxy;
- (f) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (g) verify time synchronization.

E9.10.4 For the VM05 and VM06 - Wonderware Application Object Servers 1 and 2, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP addresses, computer names, and domain;
- (c) create new application object server and deploy to a platform;
- (d) assign object instances to the AOS and deploy;
- (e) confirm correct operation of the object instance;
- (f) configure redundancy of AOS and confirm failover to backup AOS;
- (g) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (h) verify time synchronization.

E9.10.5 For the VM07 and VM08 - InTouch for Terminal Services, Rockwell Thin Manager, InTouch Access Anywhere TS1 and TS2, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP addresses, computer names, and domain;
- (c) for InTouch for Terminal Services perform the following:
 - (i) boot thin client and confirm successful log in to Terminal Server session;
 - (ii) start InTouch and confirm correct InTouch application; and
 - (iii) using the IDE, update the InTouch application and confirm corresponding update in the Terminal Server session;
- (d) for Thin Manager confirm the following:
 - (i) session tiling;
 - (ii) virtual screens;
 - (iii) session scaling;
 - (iv) shadowing;
 - (v) multi monitor support for four (4) monitors; and
 - (vi) active directory synchronization for user login;

- (e) for InTouch Access Anywhere confirm the following:
 - (i) start InTouch and confirm correct InTouch application; and
 - (ii) verify communication to VM10 - InTouch Access Anywhere Secure Gateway.
- (f) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (g) verify time synchronization.

E9.10.6 For the VM09 - Wonderware Historian, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP addresses, computer names, and domain;
- (c) confirm automatic starting of the historian and data collection;
- (d) login to Historian and confirm login credentials;
- (e) verify ability to stop the Historian from the System Management Console;
- (f) verify ability to start the Historian from the System Management Console and confirm error free operation;
- (g) verify location for circular data storage;
- (h) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (i) verify time synchronization.

E9.10.7 For the VM10 - InTouch Access Anywhere Secure Gateway, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP addresses, computer names, and domain;
- (c) verify function of the DMZ lan;
- (d) verify operation of the SCADA screens, trends, and reports using web browser;
- (e) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (f) verify time synchronization;

E9.10.8 For the VM11 - vCentre Server Virtual Appliance, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP addresses, computer names, and domain;
- (c) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (d) verify time synchronization.

E9.10.9 For the VM12 - VEEAM Backup Proxy, conduct the following tests:

- (a) confirm correct boot-up sequence and automatic starting of required services;
- (b) verify IP addresses, computer names, and domain;
- (c) verify configuration;
- (d) retrieve VM data from the production storage;
- (e) verify backup compressing, deduplicating, and encrypting;
- (f) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
- (g) verify time synchronization.

- E9.10.10 For the VM13 - WonderwareTier-2 Historian and On-Premise Insight, conduct the following tests:
- (a) confirm correct boot-up sequence and automatic starting of required services;
 - (b) verify IP addresses, computer names, and domain;
 - (c) for Tier-2 Historian confirm the following:
 - (i) login to Historian and confirm login credentials; and,
 - (ii) confirm automatic starting of the Tier-2 Historian and data replication.
 - (d) for On-Premise Insight, confirm the following:
 - (i) confirm communication to Tier-2 Historian;
 - (ii) confirm reporting functionality; and,
 - (iii) confirm web access security;
 - (e) measure and record CPU memory (GB), CPU usage (%), disk I/O, and Ethernet utilization; and
 - (f) verify time synchronization.
- E9.10.11 For the Integrated Development Environment, conduct the following tests:
- (a) export and import of object templates;
 - (b) export and import of graphics;
 - (c) add new user to security protocol and confirm user credentials;
 - (d) test the following for all object templates:
 - (i) create new object template;
 - (ii) assign UDAs, scripts, alarm conditions, and historical logging;
 - (iii) create new object template using the above object as a base;
 - (iv) confirm inheritance;
 - (v) modify base template object and confirm inheritance to the new object template; and
 - (vi) confirm user credentials required for object creation;
 - (e) test the following for all object instances:
 - (i) create a new object instance;
 - (ii) assign object to an application engine;
 - (iii) assign object to an area;
 - (iv) confirm correct PLC addressing;
 - (v) confirm user credentials required for object instance creation;
 - (vi) deploy object instance and confirm correct operation with Object Viewer;
 - (vii) add object's graphic symbols to an InTouch screen and confirm correct animation; and
 - (viii) undeploy object and delete from Galaxy.
- E9.10.12 Functional testing shall be conducted to verify correct equipment operation and response to both normal and abnormal conditions using the facility simulation system. Using the Functional Requirements Specification described in E8 and Appendix C – Process Control Narrative documents as a basis, test all control functionality and process alarm conditions. In particular test the following:
- (a) Graphic Animation
 - (i) Using the simulator verify the graphic animation for each object. Animation shall include status monitoring of the following:
 - ◆ running;
 - ◆ stopped;
 - ◆ open/close/intermediate;

- ◆ position;
 - ◆ speed;
 - ◆ alarm/fault;
 - ◆ warning;
 - ◆ flow;
 - ◆ pressure;
 - ◆ level;
 - ◆ set-points; and
 - ◆ etc.;
- (b) Equipment Faceplates
- (i) For each object confirm correct faceplate display and operation;
- (c) Equipment Control
- (i) Using the simulator confirm the following controls:
- ◆ remote manual;
 - ◆ automatic pump start/stop sequencing;
 - ◆ station master control; and
 - ◆ set-point adjustments;
- (d) Alarming
- (i) For each object activate all alarms and confirm the following:
- ◆ correct alarm message display;
 - ◆ correct alarm area assignment;
 - ◆ individual and group alarm acknowledgement; and
 - ◆ alarm reset;
- (ii) Modify alarm set-points and confirm correct response;
- (e) Historization
- (i) For each object verify the following:
- ◆ existence in the historian;
 - ◆ logging interval; and
 - ◆ scaling parameters;
- (f) Historian Client
- (i) confirm the ability to select object trend data;
- (ii) confirm the ability to adjust scaling parameters;
- (iii) confirm the ability to enter Live mode; and
- (iv) confirm the ability to save and open trend files.
- E9.10.13 FAT of the SCADA system redundancy schemes shall be conducted to confirm correct response to the various failure modes. The testing shall include the following:
- (a) Communication Failure
- (i) While the SCADA system is operating without failures, disconnect Ethernet cable from AOS1 and confirm redundant failover to AOS2. Reconnect Ethernet cable and confirm fall back to AOS1.
- (ii) While the SCADA system is operating without failures, disconnect Ethernet cable from AOS2 and confirm redundant failover to AOS1. Reconnect Ethernet cable and confirm fall back to AOS2.
- (iii) While the SCADA system is operating without failures, disconnect the primary Ethernet connection to a pump station. Confirm failover cellular modem communications. Reconnect primary Ethernet cable and confirm fall back to primary Ethernet connection.

- (iv) While the SCADA system is operating without failures, disconnect both the primary and cellular modem Ethernet connections to a pump station and confirm failover to local pump station AOS. Reconnect both the primary and cellular modem Ethernet connections and confirm fall back to AOS1 and AOS2.
- (b) AOS failure
 - (i) While the SCADA system is operating without failures, power down AOS1 and confirm redundant failover to AOS2. Power on AOS1 and confirm fall back to AOS1.
 - (ii) While the SCADA system is operating without failures, power down AOS2 and confirm redundant failover to AOS1. Power on AOS2 and confirm fall back to AOS2.
- (c) Store and forward historian
 - (i) While the SCADA system is operating without failures, power down the Wonderware Historian and confirm local storage of historical data by AOS1 and AOS2. Power on the Wonderware historian and confirm automatic population of historical data during the outage.
 - (ii) While the SCADA system is operating without failures, disconnect the primary and cellular modem Ethernet connections to a pump station and confirm local storage of historical data on thick client. Restore Ethernet connection and confirm automatic population of historical data during the communication failure.

E9.10.14 SCADA system security shall be verified during the FAT. The following tests shall be performed:

- (a) Confirmation of the IDE security. Perform the following:
 - (i) create a new user and assign to group with full privileges and confirm ability to:
 - ◆ login;
 - ◆ create new object templates;
 - ◆ create new object instances; and
 - ◆ deploy objects;
 - (ii) create a new user and assign to group with limited privileges and confirm ability to:
 - ◆ login;
 - ◆ create new object instances;
 - ◆ deploy objects; and
 - ◆ inability to create new object templates.
- (b) Confirmation of the SCADA application security. Perform the following:
 - (i) create a new user and assign to group with full privileges and confirm ability to:
 - ◆ login;
 - ◆ view system status;
 - ◆ operate equipment;
 - ◆ change operating setpoints; and
 - ◆ acknowledge alarms;
 - (ii) create a new user and assign to group with limited privileges and confirm ability to:
 - ◆ login;
 - ◆ view system status;
 - ◆ inability to operate equipment;
 - ◆ inability to change operating setpoints; and
 - ◆ inability to acknowledge alarms;

- (iii) create a new user and assign to group with privileges as outlined below and confirm ability to:
 - ◆ login;
 - ◆ view system status;
 - ◆ operate equipment;
 - ◆ inability to change operating setpoints; and
 - ◆ acknowledge alarms.

E9.10.15 The VMWare vCenter Server functionality shall be fully tested during the FAT. The following tests shall be performed:

- (a) verify the ability to modify resource allocations on VM images, including:
 - (i) CPU cores;
 - (ii) RAM;
 - (iii) harddrive capacity; and
 - (iv) Ethernet cards;
- (b) clone an existing VM image and confirm correct operation;
- (c) verify the Health Status of the vCenter Server;
- (d) verify the version of the vCenter Server instance;
- (e) verify that all vCenter Server services are available and running;
- (f) verify the connection between the vCenter Server instances and the Platform Services Controller pairs by using the vSphere Web Client;
- (g) verify the vSphere vMotion functionality;
- (h) verify the certificate of the vCenter Server instance; and
- (i) verify that the certificate is valid.

E9.11 MPRs

E9.11.1 For the FAT testing, the MPRs shall be connected to a 120 VAC source. The voltage monitoring inputs shall be connected to a three phase 120/208 VAC voltage source. Current transformers shall be connected with the ability to adjust the current input signal from zero to six hundred percent (0 - 600%). RTD winding inputs shall be connected to RTD sensors with the ability to test over temperature alarms.

E9.11.2 FAT testing of the MPRs shall include verification of the following:

- (a) confirmation of correct IP addressing;
- (b) confirmation of Modbus TCP communications to PLC and SCADA systems;
- (c) confirmation of the programmed parameters and protection settings;
- (d) response to single phase and three (3) power failures;
- (e) reverse power;
- (f) response to over current conditions (100%, 110%; 120%, 150%, and 200%);
- (g) maximum starts per hour lockout;
- (h) RTD temperature reading;
- (i) event reporting; and
- (j) lockout with local and remote reset.

E9.12 Power Meter

E9.12.1 For the FAT testing, the power meter shall be connected to a 120 VAC source. The voltage monitoring inputs shall be connected to a three phase 120/208 VAC voltage source.

Current transformers shall be connected with the ability to adjust the current input signal from zero to six hundred percent (0 - 600%) on each phase independently.

E9.12.2 FAT testing of the power meter shall include verification of the following:

- (a) confirmation of correct IP addressing;
- (b) confirmation of Modbus TCP communications to the PLC and SCADA systems;
- (c) confirmation of the programmed parameters;
- (d) voltage readings (L-N and L-L);
- (e) current readings (all phases and neutral);
- (f) power factor reading;
- (g) power reading (kVA and kW);
- (h) harmonic reading;
- (i) event recording;
- (j) historizing; and
- (k) alarm relays.

E9.13 PMCM System

E9.13.1 The PMCM system shall undergo FAT. The test equipment shall include RTDs and vibration sensors connected to the system inputs. Temperature and vibration signals shall be varied to test operation.

E9.13.2 FAT testing of the PMCM system shall include verification of the following:

- (a) confirmation of correct IP addressing;
- (b) confirmation of Modbus TCP communications to PLC and SCADA systems;
- (c) confirmation of the programmed parameters;
- (d) RTD temperature readings;
- (e) vibration sensor readings; warning and alarm output relays; and
- (f) confirmation of Machine Studio PMCM software:
 - (i) correct IP addressing;
 - (ii) configuration of the PMCM communication driver;
 - (iii) communication with the PMCMs;
 - (iv) automatic reconnection after the PMCM is disconnected;
 - (v) live measurement values;
 - (vi) live trend data; and
 - (vii) module health information.

E9.14 HMIs

E9.14.1 All LHMI hardware shall undergo FAT and the LHMI shall be connected to its corresponding PLCs and PMCMs.

E9.14.2 FAT testing of the LHMI shall include verification of the following:

- (a) correct IP addressing;
- (b) configuration of PLC communication driver;
- (c) communication with PLC;
- (d) automatic reconnection after the PLC is disconnected ;
- (e) configuration of PMCM communication driver;
- (f) communication with PMCM;

- (g) automatic reconnection after the PMCM is disconnected;
- (h) installation of HMI program;
- (i) user names and passwords;
- (j) correct start-up following cycle power on the HMI;
- (k) alarm messages following simulation of all alarms;
- (l) navigation through graphic screens;
- (m) animations;
- (n) equipment faceplates; and
- (o) historical data and trends for all analog values.

E9.15 Measurement and Payment

- E9.15.1 FAT will not be measured and will be paid for at the Contract lump sum prices by facility for "Programming, Configuration, and FAT" for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E10. COMMISSIONING

E10.1 General

- E10.1.1 Provide start-up and commissioning for the completed Works to demonstrate compliance with the Contract Documents.
- E10.1.2 Due to the sequential aspect of the Work, commissioning shall be staged by facility and component of the Work.
- E10.1.3 Where life safety systems will be affected by the commissioning activities (e.g. emergency lighting, chlorine detection, fire alarm, lower explosive limit detection, etc.), provide a twenty-four (24) hours per day/seven (7) days per week watch person and/or monitoring equipment where systems are made inoperable during the approved outage periods.
- E10.1.4 The City reserves the right to refuse a requested shutdown based on the availability of City resources or system status. Extension of critical stages as a result of shutdown requests being denied shall be assessed on a case-by-case basis.
- E10.1.5 Commissioning shall be scheduled and coordinated to avoid interference with the City or Contract Administrator's presence at other FAT or training activities.
- E10.1.6 The Contractor shall undertake commissioning works utilizing the individuals qualified as set out in B13.4.

E10.2 Submittals

- E10.2.1 Provide Submittals in accordance with Section 01 33 00 – Submittal Procedures in the NMS.
- E10.2.2 Submit a Commissioning Plan for each facility in accordance with E10.3 to the Contract Administrator for review and approval a minimum of four (4) weeks prior to the scheduled initial date of facility start-up and commissioning. Commissioning cannot start until approval of the Commissioning Plan by the Contract Administrator. Modifications to the Commissioning Plan, as directed by the Contract Administrator, shall not extend the critical stages.
- E10.2.3 Submit start-up checklists in accordance with E10.5 to the Contract Administrator for review and approval a minimum of four (4) weeks prior to the scheduled initial date of facility start-up and commissioning.
- E10.2.4 Submit completed start-up checklists in accordance with E10.5 a minimum of five (5) Calendar Days prior to commissioning the particular component of the Work.

E10.2.5 Submit the commissioning records in accordance with E10.6.7 as part of the O&M Manuals.

E10.3 Commissioning Plan

E10.3.1 A separate Commissioning Plan will be required for each facility.

E10.3.2 The Commissioning Plans shall encompass the sequence of activities and requirements for commissioning all equipment, components, systems, and sub-systems and shall include:

- (a) a general description of the systematic testing and start-up procedures for each component including complete system tests that will be performed to demonstrate that the Work performs as designed and as stated in the Functional Requirement Specification; the general approach to commissioning the Works, including the organization of the commissioning team and their responsibilities;
- (b) a description of the complete system tests that will be performed to demonstrate that the Work performs at the performance levels specified in the Functional Requirement Specification, Process Control Narrative and Specifications.
- (c) a description of required City forces (Trades and Operations Staff) and tasks to be performed by City forces in accordance with E10.7(b);
- (d) a description of the impact of the commissioning activities on the operation of the facility;
- (e) a description of the methodology for maintaining, as much as possible, system redundancy in place during the Work when any new equipment is to be put into service;
- (f) processes and procedures to be followed for the testing, diagnosis, and correction of problems, including repeat testing where required;
- (g) start-up check lists;
- (h) commissioning forms for documentation of system parameters, process setpoints, and revisions required to the Functional Requirement Specification;
- (i) where applicable, a description of the methodology for verifying all automated controls, including all operator adjustable settings and set points.
- (j) where applicable, a description of the methodology for verifying all alarms;
- (k) contingency plans in the event of equipment failures, instrument failures, and process malfunctions;
- (l) all test parameters to be monitored and measured during start-up and commissioning;
- (m) a list of test equipment to be used for each test, including the accuracy and precision of the instruments at the ranges to be used and date of last calibration;
- (n) response procedures for unsatisfactory test results including the definition of test result limits that constitute a failure, during commissioning, and start-up testing;
- (o) an I/O loop check list form to be completed during commissioning;
- (p) a detailed schedule of the expected shutdown times and durations for each system; and
- (q) a description of the planned start-up and commissioning dates for each component and system to be commissioned.

E10.4 Commissioning Team

E10.4.1 The Contractor shall identify the Commissioning Team members in the Commissioning Plan.

E10.4.2 The City will provide one (1) Certified Operator and one (1) maintenance personnel dedicated for commissioning activities.

E10.4.3 The Certified Operator and maintenance personnel will be available to the Contractor from Monday to Friday at 07:30 to 16:00, with one (1) hour for lunch. Where off-hour work is required, provide a minimum of one (1) week notice to the Contract Administrator.

E10.5 Start-up Checks

E10.5.1 The Contractor shall complete the start-up checks of all Work components to be verified prior to equipment operation as described in the Commissioning Plan.

E10.5.2 Operation of the mechanical equipment shall not be performed prior to the successful completion of the start-up check.

E10.5.3 The components requiring start-up checks are as described below:

- (a) PLC Ethernet network start-up checks shall at a minimum, include:
 - (i) verification of all Category 6 cabling as per Specification 29 10 01 – Instrumentation Cables;
 - (ii) verification of all multimode fibre optic cable as per Specification 29 10 01 – Instrumentation Cables;
 - (iii) confirmation of correct programming of all network switches;
 - (iv) verification of correct failover for a broken ring segment; and
 - (v) measurement of network traffic, packet loss, and retries;
- (b) MPRs start-up checks shall, at a minimum, include:
 - (i) confirmation that calculated protection device settings are programmed;
 - (ii) confirmation that control voltage is within tolerance;
 - (iii) confirmation that RTDs are correctly wired and measuring temperature;
 - (iv) confirmation that the correct IP addresses are configured; and
 - (v) confirmation of Ethernet communications with SCADA system and pump control panel HMI;
- (c) Master control panels and pump control panels start-up checks shall, at a minimum, include:
 - (i) confirmation that wiring terminations are secure;
 - (ii) confirmation that the correct version of PLC program is installed and the configuration is correct;
 - (iii) testing of all I/O points including verification of instrumentation operation;
 - (iv) confirmation of operation of LHMI;
 - (v) measurement of 24 VDC supply;
 - (vi) verification of redundancy failure for redundant EIO network;
 - (vii) confirmation that the correct IP addresses are configured;
 - (viii) verification of PLC Ethernet network communications; and
 - (ix) simulation of all alarm conditions;
- (d) PMCM system start-up checks shall, at a minimum, include:
 - (i) confirmation that all power and network connections are secure;
 - (ii) confirmation that mounting hardware is installed correctly and is secure;
 - (iii) confirmation that the temperature and vibration sensors are working;
 - (iv) confirmation that the correct IP address is configured;
 - (v) verification of PLC Ethernet network communications;
 - (vi) verification that the pump control panel LHMI sensor data value display; and
 - (vii) simulation of warning and alarm conditions for all measurements and confirmation of associated relay output operation;
- (e) SCADA system start-up checks shall, at a minimum, include:
 - (i) confirmation that all power and network connections are secure;

- (ii) confirmation that mounting hardware is installed correctly and is secure;
 - (iii) measurement of UPS supply voltage; and
 - (iv) confirmation of computer names and IP addresses.
- (f) Power meter start-up checks shall, at a minimum, include:
 - (i) confirmation that control voltage is within tolerance;
 - (ii) confirmation that the correct IP addresses are configured; and
 - (iii) confirmation of Ethernet communications with SCADA system.
- E10.5.4 The draft start-up check lists for all components within a facility shall be completed by the Contractor as a part of the Commissioning Plan and submitted to the Contract Administrator for review and acceptance a minimum of four (4) weeks prior to start-up at the facility.
- E10.5.5 The completed start-up check lists shall be provided a minimum of five (5) Calendar Days prior to commissioning the particular component of the Work.
- E10.6 Testing and Commissioning Activities
 - E10.6.1 All start-up, commissioning, and testing shall be performed in accordance with the approved Commissioning Plan.
 - E10.6.2 Commissioning shall include:
 - (a) pre-commissioning, which includes all start-up checks prior to component commissioning where the components are energized;
 - (b) component commissioning, where the process fluid (electrical, water, etc.) flows through the component;
 - (c) system commissioning, where the system is tested as a whole, complete with alarms; and
 - (d) performance testing.
 - E10.6.3 Coordinate operation of City equipment including breakers, motors, pumps, and valves with the City Trades and Operations Staff.
 - E10.6.4 The Contract Administrator and the City, at its discretion, may have personnel witness any testing and commissioning activities.
 - (a) Coordinate with the Contract Administrator regarding commissioning activities that the Contract Administrator and the City has expressed interest in witnessing to ensure that they are provided with every reasonable opportunity to observe the commissioning activity.
 - (b) The Contract Administrator and the City's witness of commissioning activities shall not replace or supplant any training requirements.
 - E10.6.5 Commissioning activities shall not occur at the same time as the field training.
 - E10.6.6 Provide complete and comprehensive records (the "commissioning records"), of the complete commissioning process. The commissioning records shall be a set of documents which record and demonstrate the results of the commissioning process and that the acceptance criteria have been met and shall include test result documentation, start-up checklists, commissioning forms, letters of conformity, and certificates.
 - E10.6.7 The commissioning records shall be included in the O&M Manuals.
 - E10.6.8 If a test fails during commissioning and corrective action is taken, all tests associated with the system/process shall be repeated to ensure the corrective action has not had an adverse impact on the system/process.
- E10.7 Responsibility for Commissioning
 - (a) The Contractor's responsibilities for commissioning includes:

- (i) preparing and completing the Commissioning Plans, start-up check lists, and commissioning forms for each facility;
 - (ii) scheduling activities according to the Commissioning Plan and subject to the availabilities of the City's Trades and Operations Staff;
 - (iii) conducting commissioning; and
 - (iv) adherence to the Commissioning Plan and restrictions.
- (b) The City's responsibilities for commissioning includes:
- (i) supply of Trades and Operations Staff;
 - (ii) maintenance of City equipment in a condition that the equipment is operational without defect prior to the start of and during commissioning activities; and
 - (iii) manual operation of City equipment (e.g. pumps, chlorination system, etc.) during facility shutdowns, subject to the Contractor adhering to the restrictions identified in E4.3.1.

E10.8 Measurement and Payment

- E10.8.1 Commissioning will not be measured and will be paid for at the Contract lump sum prices by facility for "Installation, Start-up, and Commissioning" for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E11. TRAINING

E11.1 General

- E11.1.1 The Contractor is responsible to provide training to City personnel for the completed Works.

- E11.1.2 Facility-specific training shall be provided after commissioning at each facility.

- (a) The first round of a training session shall be the most detailed. Refer to Table 1 Facility Training of Appendix Q – Training Tables for the minimum number of hours per training session for the first round of training.
- (b) Subsequent sessions of the same training for different facilities should include a brief recap of the previous training and detailed training on the differences at the specific facility.

- E11.1.3 Table 2 Training Participant Groups of Appendix Q – Training Tables outlines the training participant groups and what training is required for each participant group.

- (a) In addition to the training participants, the following may attend and observe training:
 - (i) City supervisors;
 - (ii) City training coordinators;
 - (iii) the City representative; and,
 - (iv) the Contract Administrator.

- E11.1.4 Table 2 Facility Training of Appendix Q – Training Tables outlines training components by facility and includes the number of training sessions required.

- E11.1.5 Training shall comprehensively instruct City personnel to competently operate and maintain the Work in accordance with Good Industry Practice. It shall be tailored for the specific audience in each course and be designed to maximize the transfer of learning, utilizing appropriate training methodologies.

- E11.1.6 Training shall contain both classroom and field training courses as outlined in Table 2 Facility Training of Appendix Q – Training Tables, organized in a format to most effectively train City personnel.

- E11.1.7 Where applicable, training shall cover and/or include:

- (a) safety;

- (b) operation;
 - (c) troubleshooting;
 - (d) preventative and predictive maintenance;
 - (e) corrective maintenance;
 - (f) parts;
 - (g) local representation;
 - (h) written evaluation of classroom portion based on learning objectives;
 - (i) evaluation of practical portion based on SOPs;
 - (j) sign in sheets and participant course evaluations; and
 - (k) certificate of completion for each participant for each module/session completed.
- E11.1.8 Provide all classroom training session materials to the City in SCORM format.
- E11.1.9 Training shall be based upon the O&Ms with complete consistency between training and the O&Ms, including SOPs and SWPs.
- E11.1.10 Incorporate feedback from training into the O&Ms.
- E11.1.11 Provide factory trained specialists and equipment manufacturers to instruct City personnel in the operation and maintenance of all Work during classroom and field training.
- E11.1.12 Training shall be scheduled and coordinated to not interfere with the operation and maintenance of the RDS.
- E11.1.13 Training shall be scheduled and coordinated to not interfere with the City or Contract Administrator's presence at other FAT or commissioning activities.
- E11.1.14 Multiple training sessions can be performed on the same day; however, they should not exceed a duration of four (4) hours per day.
- E11.1.15 Training sessions shall be limited to Business Days within the following windows of time:
- (a) 08:00 to 12:00, with a fifteen (15) minute coffee break; and
 - (b) 13:00 to 16:00, with a fifteen (15) minute coffee break.
- E11.1.16 The Contractor shall undertake training works utilizing the individuals qualified as set out in B13.4.
- E11.2 Submittals
- E11.2.1 Provide Submittals in accordance with Section 01 33 00 – Submittal Procedures in the NMS.
- E11.2.2 Submit a separate draft Training Plan for each facility to the Contract Administrator for review in accordance with E11.4 at least six (6) weeks prior to the delivery of training.
- E11.2.3 Submit a final Training Plan for each facility, incorporating all of the comments from the Contract Administrator and the City's training coordinator in accordance with E11.4 at least two (2) weeks prior to the delivery of training.
- E11.2.4 Submit the qualifications of the instructor for each training component listed in E11.3 at least eight (8) weeks prior to the delivery of the training. For each instructor, the qualifications shall, at a minimum, include the following:
- (a) certification in related coursework;
 - (b) three (3) references for similar assignments where training was conducted for operations and maintenance staff; and
 - (c) instructor biographies and curriculum vitae.
- E11.2.5 Submit the video recording of the training session(s) in accordance with E11.5 within three (3) weeks following the training session(s).

E11.3 Required Training

E11.3.1 Training shall be provided on the eleven (11) training components listed below (Refer to Table 1 Facility Training of Appendix Q – Training Tables for the training components):

- (a) PLC hardware configuration, programming, and testing, and shall include at the minimum:
 - (i) custom UDDT;
 - (ii) custom UDO;
 - (iii) program logic; and
 - (iv) redundancy failover;
- (b) MPR configuration, programming, and testing;
- (c) power meter configuration, programming, and testing;
- (d) PMCM configuration, programming, and testing, and shall include at the minimum:
 - (i) security;
 - (ii) program logic;
 - (iii) alarming; and
 - (iv) reporting;
- (e) SCADA computer hardware and virtualization, and shall include at the minimum:
 - (i) computer hardware servicing;
 - (ii) security;
 - (iii) configuration and testing of high availability clusters;
 - (iv) configuration and testing of DR;
 - (v) configuration and testing of recovery points; and
 - (vi) software licensing requirements and configuration;
- (f) SCADA system configuration, programming, and testing, and shall include at the minimum:
 - (i) security configuration;
 - (ii) UDO;
 - (iii) historian;
 - (iv) reporting;
 - (v) communication drivers;
 - (vi) redundancy; and
 - (vii) graphics;
- (g) HMI system (including LHMI and facility workstations) configuration, programming, and testing, and shall include at the minimum:
 - (i) security configuration;
 - (ii) reporting;
 - (iii) communication drivers; and
 - (iv) graphics;
- (h) network configuration, programming, and testing, and shall include at the minimum:
 - (i) Ethernet switch management;
 - (ii) redundant fibre optic ring; and
 - (iii) backup communication over the cellular modem radio system;
- (i) instrumentation configuration, programming, and testing, and shall include at the minimum:
 - (i) station flood switches; and
 - (ii) pressure transmitters;

- (j) SCADA system operation and shall include at the minimum:
 - (i) historian client;
 - (ii) reporting; and
 - (iii) graphic displays;
- (k) RDS operation, facility monitoring, control, and alarming, and shall include at the minimum:
 - (i) remote monitoring, control, and alarming from WTP;
 - (ii) backup monitoring, control, and alarming from the McPhillips Control Centre;
 - (iii) remote manual operation of pumps from the McPhillips Control Centre;
 - (iv) local monitoring, control, and alarming from pumping station; and
 - (v) local monitoring, control, and alarming from pump control panel (including HMIs and PMCM).

E11.4 Training Plan

E11.4.1 The Training Plan shall include the draft lesson plans and training manuals for each training component listed in E11.3 and Table 1 Facility Training of Appendix Q – Training Tables, including the following:

- (a) course name and outline;
- (b) detailed course description including the specific Work components addressed in the course;
- (c) planned duration;
- (d) measurable learning objectives; and
- (e) format and implementation methodology.

E11.4.2 Subject to E11.8.1, the Training Plan shall also include the training schedule for each facility and training component listed in E11.3 and Table 1 Facility Training of Appendix Q – Training Tables, including the follow:

- (a) date;
- (b) time;
- (c) training participant group; and
- (d) subject of each training session.

E11.5 Recording

E11.5.1 For each training component listed in E11.3 and Table 1 Facility Training of Appendix Q – Training Tables, one (1) of the training sessions in the first round and one (1) of the closeout training sessions (if applicable) shall be video recorded by the Contractor to provide a permanent record for the City's use.

- (a) The Contractor shall provide a USB flash drive with a digital copy of the training sessions to the Contract Administrator after the training is completed. The digital file must be named with course title and date. The USB flash drive shall be fully indexed and cataloged.
- (b) Videotaping shall be by a professional commercial videographer, experienced in shooting training videos, in both good and inclement weather.
- (c) Video format shall be digital (MPEG-4) or format approved by Contract Administrator, with sound.
- (d) Video quality shall produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
- (e) Audio shall be clear, precise, and at a moderate pace.

- E11.5.2 Further to D25, the Contractor shall advise all manufacturers and instructors providing training sessions that the training material will be video recorded.
- E11.6 Classroom Training Requirements
- E11.6.1 Classroom training sessions will be held in a room provided by the City at a suitable City facility.
- E11.6.2 The Contractor shall:
- (a) use appropriate learning resource materials, including slides and drawings, to aid in training clarity and effectiveness;
 - (b) provide in-class handouts, visual aids, and other reference materials as necessary for training participants for each training session;
 - (c) make available applicable reference materials where it will be beneficial for the City personnel to reference the material covered during the training. For example, paper copies of SOPs and SWPs should be provided if beneficial to training objectives;
 - (d) provide projectors and screens as required, easily viewable and readable by all training participants;
 - (e) be responsible for any temporary networking or other associated computer and audio requirements to implement training sessions;
 - (f) structure training according to adult learning principles to provide an interactive environment that promotes active participation; and
 - (g) use discussion, questions, and activities as appropriate during each session to provide engagement, enhance learning, and to verify that the information presented is being understood.
- E11.6.3 Provide and integrate a physical SCADA demonstration system, PLC demonstration system, PMCM demonstration system, and simulations system into any classroom training course where:
- (a) the content includes equipment monitoring and control via the SCADA system;
 - (b) the content includes alarming and alarm response;
 - (c) the content includes coordination of maintenance events and states to SCADA status indications; and
 - (d) the use of the system would clarify and/or aid in training of the training participants.
- E11.6.4 Demonstration systems should be comprised of:
- (a) small computer network with SCADA software detailed throughout the Work;
 - (b) mobile PLC unit with varied I/O;
 - (c) mobile PMCM unit; and
 - (d) the required software to simulate field instrumentation and feedback.
- E11.6.5 The SCADA demonstration system, PLC demonstration system, PMCM demonstration system, and simulation systems shall in no way impact the actual operation of the RDS and WTP in order to prevent any risk of inadvertent operation.
- E11.7 Field Training Requirements
- E11.7.1 For all required field training:
- (a) implement training using the new infrastructure;
 - (b) provide field training sessions in a manner that all participants can see and hear all demonstrations provided;
 - (c) arrange for and require City personnel to perform the demonstrated procedures;
 - (d) ensure all training is in accordance with SWPs and SOPs, and include training on the application and use of the SWPs and SOPs.

E11.8 Training Coordination with City

E11.8.1 Coordinate with the Contract Administrator regarding dates and times for training sessions. All dates and times are subject to availability of City personnel.

E11.8.2 Endeavor to coordinate field training sessions to limit the number of participants to no more than eight (8) for demonstration and hands-on training purposes.

E11.9 Measurement and Payment

E11.9.1 Training will be measured on a unit basis by facility and paid for at the Contract unit price for "Training" for supplying all materials and performing all operations herein described and all other items incidental to the Work including in this Specification and accepted by the Contract Administrator.

E12. WARRANTY SERVICES

E12.1 Warranty and Maintenance Support Services

- (a) Provide maintenance support, including twenty-four (24)-hour, seven (7) days a week, on-call technical support and corrective maintenance, via a toll free number and at no additional cost to the City for the duration of the Work until Total Performance.
- (b) Provide warranty support services, including twenty-four (24)-hour, seven (7) days a week, on-call technical support and corrective maintenance, via a toll free number and at no additional cost to the City until the conclusion of the one (1) year warranty period.
- (c) If a problem cannot be quickly solved over the telephone or through remotely connecting in to the system, attend to the Site within twenty-four (24) hours to address the problem.
- (d) The Contractor shall undertake warranty and maintenance support services utilizing the individuals qualified as set out in B13.4.
- (e) Prior to commissioning for the first facility, the Contractor shall provide detailed information to the Contract Administrator on how the City will engage the Contractors warranty and maintenance support services.

E12.2 Warranty Issues

E12.2.1 Maintain a register of all warranty issues that arise, including date, facility, specific location or equipment, details of the warranty issue, resolution, and resolution date. Submit the register to the Contract Administrator on a monthly basis and upon request.

E12.2.2 Warranty issues corrected at a specific location shall be corrected at all locations affected. Schedule the corrective warranty work with the Contract Administrator and the City.

E12.3 Services Beyond the Warranty Period

E12.3.1 Following the completion of the warranty period, the Contractor shall have an annual software, maintenance and support program. This extended annual software, maintenance and support program shall be available for the City to procure, but is additional to the Work.

E12.4 Measurement and Payment

E12.4.1 Warranty services will not be measured and will be paid for at the Contract lump sum prices for "Warranty Services" for supplying all materials and for performing all operations herein described and all other items incidental to the Work included in this Specification and accepted by the Contract Administrator.

E12.4.2 Warranty services will be paid for in equal amounts throughout the project from the commencement of Work on Site until the conclusion of the one (1) year warranty period.

E13. CLOSEOUT

E13.1 Facility Closeout

- E13.1.1 Inspect the Work and identify defect and deficiencies prior to arranging inspection with the Contract Administrator.
- E13.1.2 Arrange, attend, and assist in the inspection of the Work with the Contract Administrator after commissioning has been completed at a facility for the purpose of verifying facility closeout. Any defects or deficiencies in the Work noted during that inspection shall be remedied by the Contractor at the earliest possible instance and the Contract Administrator notified so that Work can be re-inspected.
- (a) Defects and deficiencies shall be completed within one (1) month of the initial facility closeout inspection.
 - (b) The Contract Administrator will confirm facility closeout has been achieved once defects and deficiencies are considered completed and all Submittals have been provided.
- E13.1.3 Provide the following Submittal in accordance with Section 01 33 00 – Submittal Procedures in the NMS prior to final inspection of the facility:
- (a) draft As-Built Drawings in accordance with Section 01 78 00 – Closeout Submittals in the NMS;
 - (b) electrical permit in accordance to the Section 01 78 00 – Closeout Submittals and Section 26 05 00 – Common Work Results for Electrical in the NMS;
 - (c) digital files of the programming (SCADA, PLC, and LHMI) in accordance with Division 29 – Instrumentation and Control and the Appendix C – Process Control Narrative;
 - (d) revised Functional Requirement Specification updated to align with Work performed in accordance with E8 and Appendix C – Process Control Narrative to be inserted into the O&M Manuals;
 - (e) commissioning records in accordance with E10 to be inserted into the O&M Manuals.
 - (f) Draft O&M Manuals in accordance with Section 01 78 00 – Closeout Submittals, Division 26 – Electrical and Division 29 – Instrumentation and Control in the NMS. Draft individual O&M Manuals will be required for each facility two (2) weeks prior to facility closeout.
- E13.2 Project Closeout
- E13.2.1 Substantial Performance
- (a) The Contractor shall inspect Work and identify defect and deficiencies prior to arranging a Substantial Performance inspection with the Contract Administrator in accordance with D17.
 - (b) The Contractor shall perform final updates to programming, software version, and firmware prior to Substantial Performance.
 - (c) The Contractor shall submit the following Submittals prior to Substantial Performance in accordance with 01 33 00 – Submittal Procedures in the NMS:
 - (i) final O&M Manual in accordance with Section 01 78 00 – Closeout Submittals, Division 26 – Electrical, and Division 29 – Instrumentation and Control in the NMS; and
 - (ii) final Functional Requirement Specification updated to align with Work performed in accordance with E8 and Appendix C – Process Control Narrative to be inserted into the O&M Manuals.
- E13.2.2 Total Performance
- (a) Total Performance shall be in accordance with D18.
 - (b) The Contractor shall submit the following Submittals prior to Total Performance in accordance with 01 33 00 – Submittal Procedures in the NMS:
 - (i) final As-Built Drawings; and

- (ii) digital files of the final programming (SCADA, PLC, and LHMI) in accordance with Division 29 – Instrumentation and Control and Appendix C – Process Control Narrative to align with Work performed.

E13.3 Measurement and Payment

- E13.3.1 Facility closeout will be measured on a unit basis by facility and paid for at the Contract unit price for “Facility Closeout” for supplying all materials and performing all operations herein described and all other items incidental to the Work including in this Specification and accepted by the Contract Administrator.
- E13.3.2 Project closeout will be considered incidental to the Work and no measurement or payment will be made.

E14. SLAIF GROUND DISTURBANCES

- E14.1 The Contractor shall be advised that potential ground disturbances or excavation may be required at the SLAIF Site to complete the Work. For example, this may include the investigation and exposure of electrical junction boxes or manholes.
- E14.2 Due to the historical and archaeological significance of the SLAIF Site, any ground disturbances must be communicated to the Shoal Lake 40 First Nation. The Contractor shall be subject to the following requirements:
 - (a) notify the Contract Administrator of any ground disturbances a minimum of two (2) weeks in advance; and,
 - (b) the City shall coordinate with the Shoal Lake 40 First Nation, who will lead a ceremonial event prior to the ground disturbance.

E15. WORK ON AND AROUND THE AQUEDUCT

- E15.1 Confirm the location of the aqueduct on Site with the City prior to mobilization.
- E15.2 No equipment shall be allowed within 12 m from the centre line of the aqueduct.
- E15.3 The Contractor shall be responsible to safeguard the aqueduct at all times during the construction.
- E15.4 Any damage occurred to the aqueduct from the construction activities or from the Contractor's errors and omissions in the construction shall be repaired to the satisfaction of the Contract Administrator and to the City and shall be paid for by the Contractor.

E16. ADDITIONAL WORK

- E16.1 Additional Work may be necessitated due to unforeseen circumstances that may arise during the course of the project due to:
 - (a) Additions to the scope of Work by the Contract Administrator, beyond that defined herein.
- E16.2 A cash allowance has been included as Item No. 9 “Cash Allowance for Additional Work” on Form B: Prices.
- E16.3 The City reserves the right to delete any or all of the Cash Allowance from the Contract if the Work intended to be covered by the Cash Allowance is not required, or if the Works intended are found to be more extensive than the provisional Cash Allowance.
- E16.4 Cost of additional work shall be evaluated by the methods outlined in C7.4, and a Change Order prepared by the Contract Administrator. Cost of the Change Order will be paid on the Progress Estimate and deducted from the Cash Allowance. If the valuation of the authorized work exceeds the Value of the Cash Allowance, the Contract Value will be adjusted by the shortfall.

PART F - SECURITY CLEARANCE

F1. SECURITY CLEARANCE

F1.1 Each individual proposed to perform Work under this Contract within facilities associated with the water supply, treatment, and distribution system including the SLAIF, Shoal Lake Aqueduct, Deacon Reservoir, WTP, RPS, and BPS shall be required to obtain a Public Safety Verification Check and a Police Information Check as detailed below.

F1.1.1 The Public Safety Verification Check must be obtained through Sterling BackCheck.

- (a) A Sterling BackCheck account must be setup seventy-two (72) hours prior to individual security clearances to allow sufficient time for activation of the contracting company's account. If the contracting company has an existing City of Winnipeg Sterling Backcheck vendor account, they may skip to (d) below.
- (b) An authorized individual of the contracting company must complete the Sterling Backcheck Setup Form. Click on the link below, complete the form, and hit submit. ******(This form is to be completed by the company, not by the employee requiring the security clearances). <https://forms.sterlingbackcheck.com/partners/platform2-en.php?&partner=winnipegcity>
- (c) Within forty-eight (48) hours of completing the Sterling Backcheck Setup Form, the authorized individual of the contracting company will receive a username and password for Sterling Backcheck. It will appear in their inbox as a "Welcome to Sterling Backcheck" e-mail. Upon receipt, the authorized individual of the contracting company will be asked to login to the Sterling Backcheck website to set their security questions and password. Once completed, individual security clearance requests can be submitted.
- (d) In order to run a Public Safety Verification Check and/or a Police Information Check, follow the steps below:
 - (i) click on the sub-tab labelled "Order eConsent";
 - (ii) fill out the required information about the employee proposed to perform Work under this Contract within City facilities (the person that requires the security clearances);
 - (iii) select your location under the "Order Information" section and enter the organization's phone number, if required;
 - (iv) select the required individual service(s) in the dropdown menu under the "Select Services" section. If both the Public Safety Verification Check and the Police Information Check are required, select the Sterling Backcheck Package One (with electronic identity verification). Once selected, both the Public Safety Verification Check and the Police Information Check should have a grey check mark beside them;
 - (v) Scroll down to the bottom and click the blue "Submit" button. The employee proposed to perform Work under this Contract within City facilities will be invited to complete their security clearance;
 - (vi) The employee will receive the invitation and must click on the link and complete their Public Safety Verification Check and/or Police Information Check;
 - (vii) The results of the Public Safety Verification Check and/or Police Information Check will go directly to the City of Winnipeg and to the authorized individual of the contracting company within twenty-four (24) hours; and
 - (viii) contact Ron Risley at 204-986-3758 if you have any questions regarding the Public Safety Verification Check;
- (e) Any questions related to the Sterling BackCheck process can be directed to Linda Ferens at 204-999-0912 or by email at: linda.ferens@sterlingcheck.com OR managedsupport@sterlingcheck.com

F1.1.2 The Police Information Check must be obtained from one of the following:

- (a) Sterling BackCheck;

- (i) see F1.1.1(a) thru (e) for instructions on how to set up an account and submit individuals for security checks; or
 - (b) a police service having jurisdiction at his/her place of residence;
 - (i) the original Police Information Check (Form P-612) will be provided by the Winnipeg Police Service to the individual applicant. The original has a validation sticker from the Winnipeg Police Service in the top right hand corner;
 - (ii) the applicant shall provide the original Police Information Check (Form P-612) to the Contract Administrator; or
 - (c) Commissionaires (Manitoba Division);
 - (i) forms to be completed can be found on the website at: <https://www.commissionaires.ca/en/manitoba/home>
 - (ii) the applicant shall provide the original Police Information Check to the Contract Administrator; or
 - (d) FASTCHECK Criminal Record & Fingerprint Specialists;
 - (i) forms to be completed can be found on the website at: <https://myfastcheck.com>
 - (ii) the applicant shall provide the original Police Information Check to the Contract Administrator.
- F1.2 Any individual for whom a Public Safety Verification Check and/or a Police Information Check is not provided will not be permitted to perform any Work.
- F1.3 Individuals for whom a Public Safety Verification Check indicates "CLEAR" and a Police Information Check demonstrates no previous convictions or pending charges will be permitted to perform Work as specified in F1.1.
- F1.4 Individuals for whom a Public Safety Verification Check does not indicate "CLEAR" and/or a Police Information Check demonstrates previous convictions or pending charges may not be permitted to perform any Work as specified in F1.1.
 - (a) Previous convictions or pending charges may be investigated and a determination will be made by the City as to whether the individual will be permitted to perform any Work.
 - (b) Convictions or pending charges that may preclude an individual from performing any Work include but are not limited to:
 - (i) convictions or pending charges related to property offences; and/or
 - (ii) convictions or pending charges related to crimes against another person.
 - (c) Where additional investigation related to a Public Safety Verification Check or a Police Information Check is required by the City, no extension to Critical Stages, Substantial Performance, or Total Performance, as applicable, will be provided.
 - (d) Additional investigation by the City may take upwards of six (6) weeks.
- F1.5 Prior to the award of Contract, and during the term of the Contract, if additional or replacement individuals are proposed to perform Work within City facilities, the Contractor shall supply the Contract Administrator with a Public Safety Verification Check and a Police Information Check satisfactory to the City obtained not earlier than one (1) year prior to the Submission Deadline, or a certified true copy thereof, for each individual proposed to perform the Work.
- F1.6 Any Public Safety Verification Check and Police Information Check determined to be satisfactory to the City will be deemed valid for the duration of the Contract subject to a repeated records search as hereinafter specified.
- F1.7 Notwithstanding the foregoing, at any time during the term of the Contract, the City may, at its sole discretion and acting reasonably, require an updated Public Safety Verification Check and/or a Police Information Check. Any individual who fails to provide a Public Safety Verification Check and/or a Police Information Check satisfactory to the City as a result of a repeated records search will not be permitted to continue to perform any Work as specified in F1.1.

Appendix A – Major Equipment List

Appendix B – Submittal List

Appendix C – Process Control Narrative

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix D – PLC Wiring Schematics and Loop Drawings (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix E – Process and Instrumentation Diagram Drawings (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix F – PLC Configuration, I/O List and Program Logic (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix G – Unity Pro Function Blocks (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix H – System Platform Objects (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix I – Telvent Screens (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix J – Asbestos Reports

Appendix K – Regional Water Supply SCADA System Station & Pump PLC Manual (Existing)

Appendix L – Water Treatment Plant User Requirement Specification (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix M – Sequential Function Chart Drawings (Existing)

This appendix is confidential, refer to E1.4.2 on how to obtain the document(s) included in this appendix.

Appendix N – SLAIF Requirements (Waivers, Staffhouse Rules, Safety Orientation, and Personal Information)

Appendix O – Sample Non-Disclosure Agreement

Appendix P – Laydown Areas

Appendix Q – Training Tables