

Part 1 General**1.1 CODES, STANDARDS AND PERMITS**

- .1 Perform Work in accordance with the Manitoba Building Code of Canada and any other code of provincial or local application, provided that in the case of conflict or discrepancy, the more stringent shall apply.
- .2 Meet or exceed requirements of the contract documents, specified standards, codes and referenced documents.
- .3 The Contractor is responsible for meeting or exceeding the requirements of all applicable industry standards (latest edition) including, but not limited, to the following:
 - .1 ACI: American Concrete Institute;
 - .2 ANSI: American National Standards Institute;
 - .3 ASME: American Society of Mechanical Engineers;
 - .4 ASTM: American Society for Testing and Material;
 - .5 CGSB: Canadian General Standards Board;
 - .6 CISC/CPMA: Canadian Institute of Steel Construction/Canadian Paint Manufacturers;
 - .7 CSA: Canadian Standards Association;
 - .8 EEMAC: Electrical Equipment Manufacturers Association of Canada;
 - .9 ENVIRONMENT CANADA;
 - .10 IAO: Insurers Advisory Organization;
 - .11 ICEA: Insulated Cable Engineers Association;
 - .12 IEEE: Institute of Electrical and Electronics Engineers;
 - .13 NATIONAL RESEARCH COUNCIL OF CANADA;
 - .14 NEMA: National Electrical Manufacturers Association;
 - .15 NFPA: National Fire Protection Association;
 - .16 UL: Underwriters Laboratories;
 - .17 ULC: Underwriters Laboratories of Canada;
 - .18 City of Winnipeg Standard Construction Specification;
 - .19 CPCA: Canadian Painting Contractors Association;
 - .20 Asphalt Institute; and,
 - .21 Steel Structures Painting Council.
- .4 The Contractor is responsible for obtaining and paying for all permit applications, permits, testing and inspections necessary to complete the Work.

1.2 DOCUMENTS REQUIRED

- .1 Maintain bound and updated set at job site, one copy each of following:
 - .1 Construction drawings;
 - .2 Construction specifications;
 - .3 Addenda;
 - .4 Reviewed shop drawings;
 - .5 Change orders;
 - .6 Other modifications to Contract;

- .7 Field test reports;
 - .8 Copy of approved Work schedule;
 - .9 Manufacturers installation and application instructions;
 - .10 Up to date As-Built Drawings; and,
 - .11 Job meeting minutes.
- .2 Prepare and provide to the City, drawings and specifications as required to:
- .1 Provide sufficient information to construct the buildings;
 - .2 Satisfy the Contract Administrator and Authorities having jurisdiction that requirements of codes and standards are being met; and,
 - .3 Satisfy the Contract Administrator that the requirements of the Performance Specifications are being met.
- .3 Prepare Drawings using AutoCAD and NMS specification sections. Obtain from the Contract Administrator latest version of the City of Winnipeg Drawing Standards and prepare CADD Drawings to these standards. The Contract Administrator will specify the Drawing document formats including sheet size, title block and other details.
- .4 The Contractor shall remain entirely responsible for the complete design and construction of the fire protection systems and related Site Work under this Contract.

1.3 DOCUMENT REVIEW

- .1 Provide Drawings for review at various stages of completeness as directed by the Contract Administrator
- .2 Review of any design and construction documentation by the Contract Administrator is for conformance to the specifications only and does not constitute a check of the Contractor's design or Work.
- .3 Reviews by the authorities having jurisdiction shall be acted upon by the Contractor.

1.4 PROFESSIONAL QUALIFICATIONS

- .1 Provide complete construction Drawings and calculations signed and sealed by registered architects and professional engineers, licensed to practise in the Province of Manitoba, for the respective portions of the Work.
- .2 Provide all special consultants as required by the Work such as civil or municipal engineers, geotechnical engineers, environmental engineers, and registered land surveyors as required.

1.5 EXISTING SERVICES

- .1 Where Work involves breaking into or connecting to existing services, carry out Work at times directed by governing authorities and/or the City with minimum of disturbance to facilities.
- .2 Before commencing Work, establish location and extent of existing service lines in area of Work and notify City of findings.
- .3 Submit schedule to, and obtain approval from, all governing authorities and the City for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to all affected parties.

- .4 Where unknown services are encountered, immediately advise Contract Administrator and confirm findings in writing.
- .5 Remove abandoned service lines encountered during the Work to within 2000 mm of structures. Cap or otherwise seal lines at cut-off points as directed by Contract Administrator.
- .6 Record locations of maintained, re-routed and abandoned service lines.

1.6 PREPARATION

- .1 Examine all areas undergoing, involved in, connected with new construction, renovation, alteration and demolition Work. Examine Site and adjacent Site features. Report any discrepancies from Contract documents to Contract Administrator immediately.

1.7 USE OF SITE

- .1 The Site is located at 552 Plinguet Avenue, Winnipeg, Manitoba.
- .2 Confine construction activities, parking of workers vehicles, construction equipment, areas for storage, stockpiling and plant set-up to limits of site and other areas as directed by Contract Administrator.
- .3 Do not unreasonably encumber site with materials or equipment.
- .4 Move stored products or equipment which interfere with operations of City staff or other contractors.

1.8 HOURS OF WORK

- .1 Unless otherwise authorized by Contract Administrator, limit all on-Site construction activities to:
 - .1 07:00 to 16:00 hrs. – Monday to Friday.

1.9 GENERAL QUALITY OF WORK

- .1 Perform Work in accordance with standard accepted industry practices for type of Work.
- .2 Do Work in neat and careful manner to retain work plumb, square, and straight.
- .3 When required by specifications or by manufacturers recommendations, have manufacturer, supplier or accredited agent, inspect Work which incorporates their products.
- .4 Do not permit materials to come in contact with other materials whether in presence of moisture or otherwise if conditions will result in corrosion, stain or discolouration or deterioration of completed Work. Provide compatible, durable separators where contact is unavoidable.
- .5 Materials and equipment shall be provided and installed by specialist or skilled tradesmen experienced with the specific type of material and equipment application. This also applies to drilling, cutting, fitting and patching of their Work to accommodate other installations.

1.10 MATERIALS

- .1 Provide new material only. Incorporate salvaged or used material ONLY where specifically identified herein and only with Contract Administrator's written permission. Provide purpose made items, materials, products and equipment specifically designed for the intended use and constructed to suit requirements of this project.
- .2 Use same brands of materials of each component for entire project.

1.11 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space in accordance with manufacturers' recommendations for safety, access and maintenance.

1.12 ENVIRONMENTAL REQUIREMENTS

- .1 The Contractor shall be aware that the City of Winnipeg Aqueduct passes through the Site. The Aqueduct and associated water pipelines are for potable water supply and no contamination by fuel, chemicals, etc. shall be permitted at any time. Fuels or chemicals shall not be stored within 30 m of the Aqueducts or potable water piping.
- .2 Perform Work in accordance with Federal, Provincial, and Municipal environmental regulations.
- .3 Remove designated hazardous components and waste in accordance with Federal and Provincial environmental regulations. In the case of conflict or discrepancy, the more stringent requirements shall apply.
- .4 Submittals:
 - .1 The Contractor is required to prepare and submit the following to the Contract Administrator prior to commencing construction, if applicable:
 - .1 Environmental protection plan including:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan;
 - .2 Names of persons responsible for manifesting hazardous waste to be removed from Site;
 - .3 Names of persons responsible for training site personnel; and,
 - .4 Description of environmental protection personnel training program.
 - .2 Spill Control Plan, including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .3 Construction Waste Management Plan describing on-Site waste management, disposal, reuse or materials, recycling and staff training.
 - .4 Hazardous Material Spill Management Plan describing management, reporting, emergency response and contact numbers, and staff training.
 - .5 The Contractor is advised that the following environmental protection measures apply to the Work.
 - .1 Materials Handling and Storage:
 - .1 Construction materials shall not be stored within 5 m of existing pipe centerlines, unless specified otherwise.
 - .2 Fuel Handling and Storage:

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- .1 The Contractor shall ensure that all fuel storage containers are inspected daily for leaks and spillage;
 - .2 When servicing requires the drainage or pumping of fuels, lubricating oils or other fluids from equipment, a groundsheet of suitable material (such as HDPE) and size shall be spread on the ground to catch the fluid in the event of a leak or spill;
 - .3 A sufficient supply of materials, such as absorbent material and plastic oil booms, to clean up minor spills shall be stored nearby on-site. The Contractor shall ensure that additional material can be made available on short notice; and,
 - .4 Fueling of stationary equipment shall be completed with portable tanks containing only enough fuel to fill equipment.
- .3 Waste Handling and Disposal:
- .1 The construction area shall be kept clean and orderly at all times during and at completion of construction;
 - .2 At no time during construction shall personal or construction waste be permitted to accumulate for more than one (1) day at any location on the construction Site, other than at a dedicated storage area as may be approved by the Contract Administrator;
 - .3 Indiscriminate dumping, littering, or abandonment shall not take place; and,
 - .4 No on-Site burning of waste is permitted.
- .4 Dangerous Goods/Hazardous Waste Handling and Disposal:
- .1 Dangerous goods/hazardous waste are identified by, and shall be handled according to, The Dangerous Goods Handling and Transportation Act and Regulations; and,
 - .2 The Contractor shall be familiar with The Dangerous Goods Handling and Transportation Act and Regulations.
- .5 Emergency Spill Response:
- .1 The Contractor shall ensure that due care and caution is taken to prevent spills;
 - .2 The Contractor shall report all major spills of petroleum products or other hazardous substances with the potential for impacting the environment and threat to human health and safety to the Contract Administrator and Manitoba Environment, immediately after occurrence of the environmental accident, by calling the 24-hour emergency telephone phone number: (204) 945-4888;
 - .3 The Contractor shall designate a qualified Supervisor as the on-Site emergency response coordinator for the project. The emergency response coordinator shall have the authority to redirect manpower in order to respond in the event of a spill.
 - .4 The following actions shall be taken by the person in charge of the spilled material or the first person(s) arriving at the scene of a hazardous material accident or the on-site emergency response coordinator:
 - .1 Notify emergency-response coordinator of the accident:
 - .1 Identify exact location and time of accident;
 - .2 Indicate injuries, if any; and
 - .3 Request assistance as required by magnitude of accident (Manitoba Environment 24-hour Spill Response Line (204) 945-4888, Police (RCMP), Fire Department (City of Winnipeg), Ambulance, company backup).

- .2 Assess situation and gather information on the status of the situation, noting:
 - .1 Personnel on Site;
 - .2 Cause and effect of spill;
 - .3 Estimated extent of damage;
 - .4 Amount and type of material involved; and,
 - .5 Proximity to the Aqueduct and waterways.
- .3 If safe to do so, try to stop the dispersion or flow of spill material:
 - .1 Approach from upwind;
 - .2 Stop or reduce leak if safe to do so;
 - .3 Dike spill material with dry, inert sorbent material or dry clay soil or sand;
 - .4 Prevent spill material from entering waterways and utilities by diking; and,
 - .5 Prevent spill material from entering Aqueduct manholes and other openings by covering with rubber spill mats or diking.
- .4 Resume any effective action to contain, clean up, or stop the flow of the spilled product.
- .5 The emergency response coordinator shall ensure that all environmental accidents involving contaminants shall be documented and reported to the Manitoba Environment according to The Dangerous Goods Handling and Transportation Act Environmental Accident Report Regulation 439/87.

1.13 CUTTING, PATCHING, ALTERATION AND MAKING GOOD

- .1 Verify dimensions and condition of existing Work before commencing fabrication or installation. Report any discrepancy and potential problems to Contract Administrator. Do not commence operations until written clarification is received from Contract Administrator.
- .2 Perform cutting and coring of existing masonry units suspected of having ACM's. Coordinate locations and associated requirements with the Contract Administrator. Patching, alteration and making good of these locations are included in this Work. Provide pipe sleeves as required.
- .3 Perform cutting, patching and alteration work without compromise to the:
 - .1 Structural integrity of any element of the facilities;
 - .2 Integrity of weather-exposed or moisture-resistant elements;
 - .3 Efficiency, maintenance, or safety of any operational elements;
 - .4 Visual qualities of sight-exposed elements; and,
 - .5 Integrity of required fire separations and/or fire rated assemblies.
- .4 Submit written request including a description of the proposed solution in advance of cutting or alteration which affects above.
- .5 Remove and replace defective and non-conforming Work. Resolve or make good Work with new products in accordance with the specifications.
- .6 Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection. For an assembly, refinish entire unit.

- .7 Perform patching, extending, matching, and alterations with materials, products and workmanship as required to make Work complete, consistent to identical quality standards of products, finishes and type of construction existing.

1.14 PROTECTION

- .1 Protect completed Work until final acceptance by the Contract Administrator.
- .2 Protect City Staff and other users of the Site from all hazards.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Submit to Contract Administrator submittals listed for review in accordance with the Specifications, or as requested by the Contract Administrator.
- .2 Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .1 Allow 10 Working Days for review of submittals by the Contract Administrator or the Contractor Administrator's Representative.
- .3 Do not proceed with Work affected by submittal until review is complete.
- .4 Present shop drawings, product data, samples and mock ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units converted values are acceptable.
- .6 Review submittals prior to submission to Contract Administrator. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .7 Notify Contract Administrator, in writing at time of submission for review, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify:
 - .1 Field measurements
 - .2 Field construction criteria
 - .3 Catalogue numbers and similar data
 - .4 Ensure affected adjacent Work is co-ordinated.
- .9 The Contractor's responsibility for errors and omissions in submission is not relieved by Contract Administrator's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Contract Administrator review.
- .11 Acceptance of Shop Drawings for a component or a subassembly does not constitute acceptance of the complete assembly of which it is a part.
- .12 The Contractor shall make any corrections required by the Contract Administrator and shall resubmit the required number of corrected copies of Shop Drawings. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections requested by the Contract Administrator on previous submission.
- .13 After Contract Administrator's review and return of copies, distribute copies to sub-trades as appropriate.
- .14 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The Contractor shall arrange for the preparation of clearly identified Shop Drawings as specified or as the Contract Administrator may reasonably request. Shop Drawings are to clearly indicate materials, weights, dimensions, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, clearly indicate that all such attachments and connections have been properly coordinated, regardless of the trade under which the adjacent articles or equipment will be supplied and installed. Shop Drawings are to indicate their relationship to design Drawings and Specifications. Notify the Contract Administrator in writing of any deviations in Shop Drawings from the requirements of the Contract Documents.
- .2 Have Shop Drawings stamped, signed and dated by a Professional Engineer licensed to practice in the Province of Manitoba where required in the Specifications or by the Contract Administrator.
- .3 The Contractor shall examine all Shop Drawings prior to submission to the Contract Administrator to ensure that all necessary requirements have been determined and verified and that each Shop Drawing has been checked and coordinated with the requirements of the Work and the Contract Documents. Examination of each Shop Drawing shall be indicated by stamp, date and signature of a responsible person of the subcontractor for supplied items and of the Contractor for fabricated items. Shop Drawings not stamped, signed and dated will be returned without being reviewed and stamped "Re-submit". Ensure that the following are verified:
 - .1 Field measurements.
 - .2 Field construction criteria.
 - .3 Catalogue numbers and similar data.
- .4 Submit one electronic PDF copy, individual file size not to exceed 5 MB.
- .5 Shop Drawing reviews by the Contract Administrator is solely to ascertain conformance with the general design concept. Responsibility for approval of detail design inherent in Shop Drawings rests with the Contractor and review by the Contract Administrator shall not imply such approval.
- .6 Shop Drawings will be returned to the Contractor with one of the following notations:
 - .1 "REVIEWED" or "NO EXCEPTIONS TAKEN", distribute additional copies as required for execution of the Work.
 - .2 "REVIEWED AS MODIFIED" or "MAKE NOTED CORRECTIONS", ensure that all copies for use are modified and distributed, same as specified for "REVIEWED".
 - .3 "REVISE AND RESUBMIT", make the necessary revisions, as indicated, consistent with the Contract Documents and submit again for review.
 - .4 "NOT REVIEWED" or "REJECTED", submit other Drawings, brochures, etc., for review consistent with the Contract Documents.
 - .5 Only Shop Drawings bearing "REVIEWED", "NO EXCEPTIONS TAKEN", "MAKE NOTED CORRECTIONS", or "REVIEWED AS MODIFIED" shall be used on the Work unless otherwise authorized by the Contract Administrator.
- .7 After submittals are noted as "REVIEWED", "NO EXCEPTIONS TAKEN", "MAKE NOTED CORRECTIONS" or "REVIEWED AS MODIFIED", no further revisions are permitted unless re-submitted to the Contract Administrator for further review.
- .8 Any adjustments made on Shop Drawings by the Contract Administrator are not intended to change the Contract Price. If it is deemed that such adjustments affect the Contract

Price, clearly state as such in writing prior to proceeding with fabrication and installation of Work.

- .9 Make changes in Shop Drawings, which the Contract Administrator may require, consistent with Contract Documents. When re-submitting, notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.
- .10 For all shop drawings, with the exception of design drawings on the City title blocks show the following information in lower right hand corner.
 - .1 Project Title.
 - .2 Tender number or other project number assigned by the Contract Administrator.
 - .3 Name of the depicted item in accordance with the Specifications and Drawings.
 - .4 Specification section number if applicable
 - .5 Proposed option if applicable.
 - .6 Name of Contractor or Subcontractor.
- .11 Accompany email submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and Bid Opportunity number.
 - .3 Contractor 's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Specification Section, Title, Number, and Clause
 - .6 Other pertinent data.
 - .7 Date and revision dates.
 - .8 Name of:
 - .1 Contractor
 - .2 Subcontractor
 - .3 Supplier
 - .4 Manufacturer
 - .5 Separate detailer when pertinent
 - .9 Identification of product or material.
 - .10 Relation to adjacent structure or materials.
 - .11 Field dimensions, clearly identified as such.
 - .12 Specification section name, number and clause number or drawing number and detail/section number.
 - .13 Applicable standards, such as CSA or CGSB numbers.
 - .14 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with Contract Documents.

1.3 PROCEDURES

- .1 The Contractor shall, if required by the Contract Administrator, submit for the review of the Contract Administrator method statements which describe in detail, supplement with Drawings where necessary, the methods to be adopted for executing any portion of Work.
- .2 These statements shall also include details of constructional plant and labour to be employed. Acceptance by the Contract Administrator shall not relieve the Contractor of any responsibilities, nor shall reasonable refusal to approve entitle the Contractor to extra payment or an extension of time.

- .3 Other Considerations
 - .1 Fabrication, erection, installation or commissioning may require modifications to equipment or systems to conform to the design intent. Revise pertinent shop drawings and resubmit.
 - .2 Material and equipment delivered to the site of the works will not be paid for at least until pertinent shop drawings have been submitted and reviewed.
 - .3 Incomplete shop drawing information will be considered as stipulated deductions for the purposes of progress payment certificates.
 - .4 No delay or cost claims will be allowed that arise because of delays in submissions, re-submissions and review of shop drawings.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION

- .1 Allow Contract Administrator access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Contract Administrator instructions, or law of Place of Work.
- .3 If the Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 The Contract Administrator will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, the City shall pay cost of examination and replacement.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies may be engaged by the City for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the City. Costs of additional tests required due to defective Work shall be paid by the Contactor.
- .2 All equipment required for executing inspection and testing will be provided by the respective agencies.
- .3 Employment of inspection/testing agencies does not relieve or relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Contract Administrator at no cost to the City. Pay costs for retesting and reinspection.

1.3 ACCESS TO WORK

- .1 The City, the Contract Administrator, and other authorities having jurisdiction shall have access to the work.

1.4 PROCEDURES

- .1 Notify appropriate agency and Contract Administrator in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Contract Administrator as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Contract Administrator it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, the City will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Contract Administrator.

1.6 REPORTS

- .1 Submit draft inspection and test reports to Contract Administrator, prior to inclusion with the O&M manuals, in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

1.2 CONTRACTOR'S OFFICE

- .1 Accommodation for the Contractor's office, plant, tools, equipment, and materials (including fuel) shall be the responsibility of the Contractor. Such accommodation at the Site shall be located after consultation with the Contract Administrator. The Contractor shall be responsible for the protection of its plant, tools, equipment, and materials stored on-site. Materials stored on the City's premises shall be neatly stacked and protected from the weather.
- .2 The Contractor shall confine their activities to the minimum area necessary for undertaking and completing the Work. Material and equipment storage areas shall be at locations acceptable to the Contract Administrator.
- .3 The Contractor's construction activities shall not encroach or enter onto private property without written consent from the owner of the property concerned. The Contractor shall provide the Contract Administrator with a copy of the written agreement with the property owner.
- .4 The Contractor shall maintain a daily signing log for staff and subcontractor's staff on site.

1.3 LAYDOWN AND STORAGE

- .1 All construction materials shall be stored at designated storage areas. Stored combustible materials shall be separated by clear space to prevent fire spread and allow access for manual firefighting equipment, including fire hoses, extinguishers, hydrants, etc.
- .2 Designated areas shall be used for storage of flammable and combustible liquids and gases. Spills shall be contained as required by Provincial Regulations.
- .3 Pressurized dry chemical fire extinguishers of suitable capacity or equally effective extinguishers as per NFPA 10 shall be provided where:
 - .1 Flammable liquids are stored or handled.
 - .2 Welding or flame cutting is performed.

1.4 TEMPORARY CONSTRUCTION MATERIALS

- .1 Tarpaulins and plastic coverings shall consist of fire retardant materials, which are UL or FM listed or approved, or which have passed the Large Scale Test specified in NFPA-701.

1.5 TOILETS AND WASHROOMS

- .1 Sanitary facilities for work force will be provided.
- .2 Keep area and premises in sanitary condition.

1.6 DISPOSAL OF WASTE MATERIALS

- .1 Spoiled and waste materials shall not be dumped, under any circumstances, in any locations other than those approved by the local authorities. Any cost for permits and fees for disposing of waste materials shall be at the Contractor's expense.
- .2 Disposal of all excavated and waste materials shall be in accordance with the requirements of the appropriate provincial regulatory agencies.
- .3 When working anywhere within the Works the Contractor shall at the end of each working day remove the rubbish and leave the Site in a clean and tidy state, to the satisfaction of the Contract Administrator. If this is not done, the City will clean the Site and charge the Contractor.

1.7 PARKING

- .1 The Contractor parking shall be as designated by the Contract Administrator. The parking shall be arranged and maintained so that it does not disrupt the site's operation and access for the City's staff.

1.8 USE OF PERMANENT WATER SUPPLY, HEAT, POWER LIGHT, AND TELEPHONE

- .1 The Contractor shall coordinate the use of permanent water supply, heat, and power inside the City's facilities with the Contract Administrator.

1.9 SITE SECURITY

- .1 The Contractor is responsible for all project material and equipment stored on the site.

1.10 SCAFFOLDING

- .1 Provide and maintain adequate scaffolding as required. Scaffolding is to be rigid, secure, and constructed to ensure adequate safety for workers. Erect without damage to the building or finishes.
- .2 Scaffolding in accordance with CAN/CSA-S269.2.

1.11 FACILITY ELECTRICAL SUPPLY AND DISTRIBUTION

- .1 If service interruptions are necessary, such interruptions shall be made only at times approved by the Contract Administrator.

1.12 HOISTING

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Hoists and cranes to be operated by qualified operator.

1.13 WORK SCHEDULING AND OPERATIONS

- .1 Plan and schedule work to minimize outages on the sites operations.
- .2 Provide Work Plan of all shutdowns and facility service tie-ins for approval to Contract Administrator a minimum of 7 days prior to start of planned work. Detail work date, start/stop times, duration and required equipment or system shutdowns.
- .3 Do not start work on site until approval is provided from the Contract Administrator.

1.14 WARNINGS AND TRAFFIC SIGNS

- .1 When Work is performed within public areas, provide and erect adequate warning signs as necessary to give proper warning. Place signs sufficiently in advance to enable public to respond to directions.
- .2 Provide and maintain signs and other devices required to indicate construction activities or other temporary or unusual conditions resulting from the Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Conform to reference standards, in whole or in part as specifically requested in specifications.
- .2 If there is question as to whether products or systems are in conformance with applicable standards, the Contract Administrator reserves the right to have such products or systems tested to prove or disprove conformance.
- .3 Cost for such testing will be borne by the City in event of conformance with Contract Documents or by the Contactor in event of non-conformance.

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection. Should disputes arise as to quality or fitness of products, decision rests strictly with the Contract Administrator based upon requirements of Contract Documents.
- .3 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .4 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

- .1 Immediately upon signing Contract or being issued a Letter of Intent, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify the Contract Administrator of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify the Contract Administrator at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Contract Administrator reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 METRIC PROJECT

- .1 Unless otherwise noted, this project has been designed and is to be constructed in the International System (SI) of Units metric system of measurements.
- .2 During construction, when specified metric elements are unattainable at the time they are required to meet the construction schedule, the Contactor shall notify the Contract Administrator in writing and suggest alternative substitutions. Costs due to these substitutions shall be borne by the Contactor.

1.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber and similar products on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of the Contract Administrator.
- .9 Touch-up damaged factory finished surfaces to Contract Administrator's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify the Contract Administrator in writing, of conflicts between specifications and manufacturer's instructions, so that the Contract Administrator will establish the course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Contract Administrator to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

- .2 Before installation inform the Contract Administrator if there is interference. Install as directed by the Contract Administrator.

1.10 REMEDIAL WORK

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

- .1 Consider location of existing items as approximate. Coordinate location of new mechanical and electrical items with the Contract Administrator.
- .2 Inform the Contract Administrator of conflicting installation. Install as directed.

1.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member without written approval of the Contract Administrator, unless specifically indicated.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 WORKMANSHIP

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify the Contract Administrator if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. The Contract Administrator reserves the right to require dismissal from site, workers deemed incompetent or careless.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of City or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of City or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 MATERIALS

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Remove and replace defective and non-conforming Work.
- .4 Provide openings in non-structural elements of Work for penetrations of Work.

- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .7 Restore work with new products in accordance with requirements of Contract Documents.
- .8 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .9 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material, full thickness of the construction element.
- .10 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .11 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.
- .12 Provide pipe sleeves for all penetrations.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by City or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Contract Administrator. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Dispose of waste materials and debris off site.
- .6 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .7 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3 Copy will be returned after final inspection, with Contract Administrator's comments.
- .4 Revise content of documents as required prior to final submittal.
- .5 Furnish evidence, if requested, for type, source and quality of products provided.
- .6 Defective products will be rejected, regardless of previous inspections. Replace defective products at own expense.
- .7 Pay costs of transportation.

1.2 OPERATING AND MAINTENANCE MANUALS

- .1 Prepare using personnel experienced in maintenance and operation of described products.
- .2 Operation and maintenance instructions and technical data to be sufficiently detailed with respect to design elements, construction features, component function, correct installation procedure and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation. Technical data to be in form of approved shop drawings, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists.
- .3 For the guidance of the City's operating and maintenance personnel, the Contractor shall prepare Operating and Maintenance (O&M) Manuals for the Work, describing in detail the construction of each part of the Work and the recommended procedure for operation, servicing and maintenance.
- .4 One (1) advance copy of the manuals shall be submitted prior to Substantial Performance of the Work for review and comments. After review, four (4) copies of the final manuals and two (2) copies on separate USB flash drives shall be submitted. Electronic copies shall be in pdf format, searchable, and have an index included in the file.
- .5 For the guidance of the City's operating and maintenance personnel, the Contractor shall prepare O&M Manuals for the Work, describing in detail the construction of each part of the Work and the recommended procedure for operation, servicing and maintenance.
- .6 All instructions in these manuals shall be in simple language to guide the City in the proper operating and maintenance of this installation.
- .7 In addition to information called for in the Specifications, include the following:
 - .1 Overall Title sheet, labelled "Operation and Maintenance Instructions", and containing project name and date, facilities covered in the manual, City's Contract number, the name and address of the Contractor, and the issue date.
 - .2 Overall list of contents, indicating the facilities upgraded by the project.

- .3 Title sheet for each section, labelled "Operation and Maintenance Instructions", the applicable facility, and containing project name and date.
- .4 List of contents for each section.
- .5 Include:
 - .1 Brochures/catalogue excerpts of all components of the Work
 - .2 Documentation of all test results
 - .3 Complete set of equipment and assembly drawings
 - .4 Installation, start-up, O&M Manuals
 - .5 Any specific requirements from the Specifications
 - .6 Reviewed Shop Drawings of all equipment
 - .7 Design calculations
 - .8 Include sections for the as-built drawings of all installations. Drafted record drawings of size 432x279mm (11 x 17")
 - .9 Names, addresses, and telephone numbers of all major sub-contractors and suppliers.
- .6 Modify and supplement the manual as required by the Contract Administrator.
- .7 Format to be as follows:
 - .1 Organize data as instructional manual.
 - .2 Binders: vinyl, hard covered, 3 'D' ring, with spine and face pockets.
 - .3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
 - .4 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.3 AS-BUILT DOCUMENTS

- .1 Identify Drawings as "Project As-Built Copy". Maintain in good condition and make available for inspection on-site by Contract Administrator at all times.
- .2 Quality Assurance:
 - .1 Furnish qualified and experienced person, whose duty and responsibility shall be to maintain as-built documents.
 - .2 Accuracy of Records:
 - .1 Coordinate changes within as-built documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
 - .2 Purpose of as-built documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
- .3 Make entries within one (1) Working Day after receipt of information that a change in the Work has occurred.
- .4 Prior to submitting each request for progress payment, request the Contract Administrator's review and approval of current status of as-built documents. Failure to properly maintain, update, and submit as-built documents may result in a deferral by the Contract Administrator to recommend whole or any part of Contractor's Application for Payment, either partial or final.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 AS-BUILT DOCUMENTS

- .1 Prior to requesting Substantial Performance provide all recorded information on print drawings. Transfer recorded information to AutoCAD files in DWG format. Submit DWG files, also with electronic files in PDF format to Contract Administrator for review.

- .2 If submitted documents do not meet the conditions of the Contract the Contract Administrator will return a marked-up set of documents to the Contractor in PDF format. Contractor to make revisions indicated and submit final as-built documents.

- .3 If submitted documents met the conditions for the Contract the Contract Administrator will direct the Contractor to submit the final as-built documents.
 - .1 submit one (1) set of size A1 Mylar and one (1) electronic copy of PDF and AutoCAD files of the final as-built drawings

END OF SECTION

Part 1 General

1.1 DESCRIPTION

- .1 Demonstrate operation and maintenance of equipment and systems to City personnel as equipment is replaced and upgraded.
- .2 City will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

1.2 QUALITY CONTROL

- .1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct City personnel, and provide written report that demonstration and instructions have been completed.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Give time and date of each demonstration, with list of persons present.

1.4 CONDITIONS FOR DEMONSTRATIONS

- .1 Equipment has been inspected and put into operation in accordance with Section 01 45 00.
- .2 Testing, adjusting, and balancing have been performed and equipment and systems are fully operational.

1.5 PREPARATION

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

1.6 DEMONSTRATION AND INSTRUCTIONS

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.
- .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
- .3 Review contents of manual in detail to explain aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 The work of this section the provision of all design, labour, materials, equipment and services required to cut and repair existing slabs on grade as required for a complete project. The work includes, but is not necessarily limited to, concrete slabs on grade and concrete structural slabs.

1.2 RELATED SECTIONS

- .1 21 00 00 - Fire Protection Sprinkler Systems
- .2 33 00 00 – Water Supply and Distribution Systems

1.3 REFERENCES

- .1 City of Winnipeg
 - .1 Standard Construction Specifications
- .2 Government of Manitoba
 - .1 Manitoba Regulation 31/2011, Manitoba Building Code
- .3 Canadian Standards Association (CSA)
 - .1 CSA A23.1-09, Concrete Materials and Methods of Concrete Construction
 - .2 CSA A23.2-09, Test Methods and Standard Practices for Concrete
 - .3 CSA A23.3-04 (R2010), Design of Concrete Structures
 - .4 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement
 - .5 CSA W186-M1990 (2012), Welding of Reinforcing Bars in Reinforced Concrete Construction
- .4 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-51M, Polyethylene Sheet for Use in Building Construction
- .5 ASTM
 - .1 ASTM-D1751-04 (2013), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit engineered drawings to show proposed material, reinforcement, and procedures for the cutting and patching of floor slabs to facilitate the installation of new sprinkler systems and sanitary drains.
- .3 Each engineered drawing to be sealed by a qualified professional engineer licensed to practice in the Province of Manitoba.
- .4 Prepare drawings in accordance with the City of Winnipeg Drafting Standards Manual in Appendix A, National Building Code requirements and applicable NFPA installation standards.

1.5 QUALITY ASSURANCE

- .1 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test sample taken.

Part 2 Design

2.1 GENERAL

- .1 Design cast-in-place concrete in accordance with CAN/CSA-A23.3.
- .2 Design and detail reinforcing to 'Reinforcing Steel Manual of Standard Practice', current edition, by Reinforcing Steel Institute of Ontario and as required.
- .3 Do reinforcing work in accordance with CAN/CSA A23.1-09 and welding of reinforcing with CSA W186-M1990 (R2012), or where required otherwise.

Part 3 Products

3.1 MATERIALS AND FINISHES

- .1 Materials to CAN/CSA A23.1-09, unless required otherwise.
- .2 Reinforcing steel bars to CAN/CSA-G30.18-09 unless required otherwise.
- .3 Pre-moulded joint fillers: Bituminous impregnated fibreboard: to ASTM-D1751-04 (2013).
- .4 Granular base and sub-base materials to City of Winnipeg Standard Construction Specification CW3110.
- .5 Polyethylene film: to CGSB 51-GP-51M. Minimum thickness 0.152 mm
- .6 Non-metallic floor hardener: premixed, quartz aggregate abrasion resistant hardener.
- .7 Chemical hardener: magnesium fluosilicate and zinc fluosilicate blend.

Part 4 Execution

4.1 FABRICATION / INSTALLATION

- .1 Do concrete floor finishing in accordance with CAN/CSA-A23.1-09 or where otherwise required.
- .2 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1-09 and testing in accordance with CAN/CSA-A23.2-09, except where required otherwise. Observe all hot and cold weather requirements of CAN/CSA-A23.1-09.
- .3 Finish concrete in accordance with CAN/CSA-A23.1-09. Finish concrete as follows:
 - .1 Floated finish: concrete surface to receive waterproof membranes, ceramic, and quarry tile where applicable.
 - .2 Trowelled finish: concrete surfaces to receive resilient tile, other floor coverings, finishes, exposed interior floor areas.

- .3 Brushed/Broom finish: exterior concrete slabs, ramps, sidewalks, paving, aprons, steps.
- .4 All floor slabs to be finished to: CAN/CSA-A23.1-09, flat, or to suit application.
- .5 Use compatible additives, admixtures and hardeners.
- .6 Cure concrete in accordance with CAN/CSA-A23.1-09 except where required otherwise.
- .7 Saw cut crack-control joints to CAN/CSA-A23.1-09.
- .8 Apply concrete sealing in accordance with manufacturer's instructions.
- .9 Prior to placing granular material in 150 mm lifts to form the upper subgrade care should be taken to ensure that no frost is present in the soil and that black organic soil is removed. After placing the granular subgrade it must be compacted until the density of the material is 98% of its maximum dry density.
- .10 Provide adequate cold/hot weather protection as required during curing period.
- .11 Grout reinforcing dowels with epoxy grout.

4.2 CLEAN UP

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove excess materials and debris and clean adjacent surfaces immediately after application.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 The work of this section includes the provision of all design, labour, materials, equipment and services required to fabricate and install interior doors as required for a complete project. The work includes, but is not necessarily limited to, the items referenced herein:
 - .1 Interior swinging doors;
 - .2 Interior entrance doors;
 - .3 Interior door hardware.
- .2 Coordinate provision of interior doors for sprinkler tree rooms.

1.2 RELATED SECTIONS

- .1 09 20 00 – Interior Partitions
- .2 09 50 00 – Ceiling Finishes
- .3 09 01 00 – Paint Finishes

1.3 REFERENCES

- .1 Government of Manitoba
 - .1 Manitoba Regulation 31/2011, Manitoba Building Code

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

Part 2 Design

2.1 GENERAL

- .1 All hollow metal frames in masonry or concrete walls shall be filled with grout. All metal doors and frames painted.
- .2 Provide acoustic and/or fire-ratings to doors, frames and hardware as required. Where doors are fire-rated or ULC and/or STC rated, door frames and hardware shall match.
- .3 Provide sealant around all hollow metal frames, both sides.
- .4 Doors must be operable by a single-handed operation (lever handles where possible) and must operate with a minimum pressure of 22N for interior doors and 38N for exterior doors.
- .5 Where possible, doors should not open onto halls and corridors.

- .6 The distance between two hinged doors in series must be a minimum of 1200mm plus the width of any door swinging into this space.
- .7 Provide hardware to match existing on site or as directed by the City Project Manager.

Part 3 Products

3.1 STEEL FIRE RATED DOORS AND FRAMES

- .1 General
 - .1 Labeled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4 S104M and CAN4 S105M.
 - .2 Install labeled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Materials and Finishes
 - .1 Galvanized steel sheet: commercial quality to ASTM A568, Class 1, hot dip, galvanized to ASTM-A527-80. Coating designation known commercially as 'Colourbond', 'Satincoat' or 'Gavanneal'.
 - .2 Doors
 - .1 Door face sheets to interior doors 16ga base thickness.
 - .2 Door face sheets to butt side of door 16ga base thickness.
 - .3 Door face sheets to non-butt side of door 16ga base thickness.
 - .3 Door Core, hollow steel, vertically stiffened with steel ribs and all voids filled with semi-rigid fibrous insulation minimum density 24kg/m³ polystyrene or polyurethane.
 - .4 Steel frames to openings 1200mm or less in unsupported width 16ga base thickness. Steel frames to openings over 1200mm unsupported width 14ga base thickness.
 - .5 Provide other door and frame components in accordance with Canadian Steel Door and Frame Manufacturers Association requirements.
 - .6 Primer for galvanized steel sheet.
 - .7 Welding: conform to CSA W59.
- .3 Fabrication
 - .1 Fabricate doors and frames as detailed, to Canadian Steel Door and Frame Manufacturers' Association, Canadian Manufacturing Specifications for Steel Doors and Frames; except where specified otherwise. Reinforce door and frames to suit hardware requirements.
 - .2 Blank, reinforce, drill and tap doors and frames for mortised hardware. Reinforce doors and frames for surface mounted hardware.
 - .3 Shop prime cold rolled steel sheet. Apply, at factory, touch up primer to doors and frames manufactured from galvanized steel where coating has been removed during fabrication.
 - .4 Provide fire labelled doors and frames, tested in strict conformance with CAN4-S104 and listed by a recognized agency having a factory inspection service.
 - .5 Fabricate doors with longitudinal edges seamless, welded, filled and sanded flush. Fabricate doors with top and bottom channels flush and filled solid, extending full width of door and welded to both faces.
 - .6 Frames: Cut mitres and joints accurately and weld continuously on inside of frame profile. Grind welded corners and joints to flat plane, fill with metallic paste filler and sand to uniform smooth finish.

- .7 Provide adjustable jamb anchors for fixing at floor and wall. Locate wall anchors immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on strike jamb.

3.2 HARDWARE

- .1 Hardware to match existing. Keying to be confirmed on site.

Part 4 Execution

4.1 INSTALLATION

- .1 Install 3 bumpers on strike jamb for each single door and 2 bumpers at head for pairs of doors.
- .2 Provide anchors not more than 150mm from top and bottom of each jamb, and intermediate anchors at 660mm on centre maximum, for frames in previously placed concrete, masonry or structural steel.
- .3 Butt joints of mullions, transom bars, centre rails and sills and cope accurately, securely welded.
- .4 Make provisions for glazing as required and provide necessary formed channel glazing stops, minimum 16mm height. Accurately fit, butted corners and fastened to frames with counter sunk oval head sheet metal screws.
- .5 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
 - .1 Hinge side: 1.0 mm.
 - .2 Latchside and head: 1.5 mm.
 - .3 Finished floor: 13 mm.
- .6 Set frames plumb, square, level and at correct elevation. Secure anchorages and connections to suit adjacent construction. Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .7 All hardware to be supplied and installed to meet or exceed required STC/ULC ratings and as per manufacturer's instructions.
- .8 Exposed fastening devices to match finish hardware.
- .9 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plates to cover fasteners.
- .10 Wall stops are to be used wherever possible. Provide proper blocking to prevent damage.

4.2 CLEAN UP

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Moisture testing of substrates.
- .2 Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to limits defined under MPI Repainting Maintenance Manual requirements.
- .3 Specific pre-treatments noted herein or specified in the MPI Repainting Maintenance Manual.
- .4 Sealing/touch up, spot priming, and/or full priming surfaces for repainting in accordance with MPI Repainting Maintenance Manual requirements.
- .5 Provision of safe and adequate ventilation as required where toxic and/or volatile/flammable materials are being used over and above temporary ventilation supplied by others.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 Submittal Procedures.
- .2 Section 01 45 00 Quality Control.
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 01 74 11 – Cleaning.
- .5 Section 01 78 00 Closeout Submittals.
- .6 Section 09 20 00 – Interior Partitions
- .7 Section 09 50 00 – Ceiling Finishes

1.3 REFERENCES

- .1 Maintenance Repainting Manual by the MPI, including Identifiers, Evaluation, Systems, Preparation and Approved Product List.
- .2 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
- .3 National Fire Code of Canada.

1.4 QUALITY ASSURANCE

- .1 Contractor shall have a minimum of five years proven satisfactory experience. Provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in repainting work. Apprentices may be employed provided they work

under the direct supervision of a qualified journeyman in accordance with applicable trade regulations.

- .3 Conform to latest MPI requirements for interior repainting work including cleaning, preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with the latest edition of the MPI Approved Product List and shall be from a single manufacturer for each system used.
- .5 Paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.
- .6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Contract Administrator.
- .7 Standard of Acceptance: When viewed using final lighting source surfaces shall indicate the following:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.
 - .2 Ceilings: No defects visible from floor at 45° to surface.
 - .3 Final coat to exhibit uniformity of colour and sheen across full surface area.

1.5 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Provide paint products meeting MPI "Environmentally Friendly" E2 or E3 ratings based on VOC (EPA Method 24) content levels.

1.6 SCHEDULING OF WORK

- .1 Submit work schedule for various stages of painting to Contract Administrator for approval. Submit schedule a minimum of 48 hours in advance of proposed operations.
- .2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Contract Administrator such that painted surfaces will have dried and cured sufficiently before occupants are affected.
- .3 Obtain written authorization from Contract Administrator for changes in work schedule.
- .4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about the building.

1.7 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.
- .3 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used.
- .4 Submit WHMIS SDS for paint and coating materials to be used.
- .5 Upon completion, submit records of products used. List products in relation to finish system and include the following:

- .1 Product name, type and use (i.e. materials and location).
- .2 Manufacturer's product number.
- .3 Colour code numbers.
- .4 MPI Environmentally Friendly classification system rating.
- .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .6 Provide product data, application instructions, safety data sheets for incorporation into Operations and Maintenance Manual.

1.8 DELIVERY, HANDLING AND STORAGE

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact.
- .3 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .4 Remove damaged, opened and rejected materials from site.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and equipment in a secure, dry, well-ventilated area with temperature range between 7°C to 30°C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.
- .7 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Contract Administrator. After completion of operations, return areas to clean condition to approval of Contract Administrator.
- .8 Remove paint materials from storage in quantities required for same day use.
- .9 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .10 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.9 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces.

- .2 Perform no repainting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application and until paint has cured sufficiently.
 - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available.
 - .5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless specifically preapproved by Contract Administrator and applied product manufacturer, perform no repainting work when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 Relative humidity is above 85% or when dew point is less than 3°C variance between air/surface temperature.
 - .5 Rain or snow is forecast to occur before paint has thoroughly cured.
 - .6 It is foggy, misty, raining or snowing at site.
 - .2 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except use a simple "cover patch test" on concrete floors to be repainted.
 - .3 Perform no repainting work when maximum moisture content of substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .4 Test painted concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Application Requirements:
- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise preapproved by the specific coating manufacturer.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:
 - .1 Temperature is expected to drop below 10°C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity

conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

- .7 Schedule repainting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Ensure emptied containers are sealed and stored safely.
- .4 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Contract Administrator.
- .5 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .6 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .7 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .8 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
- .9 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .10 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

Part 2 Design

2.1 GENERAL

- .1 Comply with flame spread requirements of MBC. Provide finishes that are compatible and consistent with each other to suit level of finish specified in this section. Select from readily available stock from suppliers with proven delivery record.
- .2 Paint material shall be products of a single manufacturer.

Part 3 Products

3.1 MATERIALS

- .1 Paint materials listed in the latest edition of the MPI Approved Product List (APL) are acceptable for use on this project.
- .2 Paint materials for repaint systems shall be products of a single manufacturer.
- .3 Low odour products: whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Paints, coatings, thinners, solvents, cleaners and other fluids used in repainting, shall:
 - .1 Be water-based, water soluble, water clean-up.
 - .2 Be non-flammable.
 - .3 Not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
 - .4 Be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .5 Be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .6 Be manufactured in a manner where matter generating a 'Biochemical Oxygen Demand' (BOD) in undiluted production plant effluent discharged to a natural watercourse or a sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.
 - .7 Be manufactured in a manner where the total suspended solids (TSS) content in undiluted production plant effluent discharged to a natural watercourse or a sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.
- .5 Paints and coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .6 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

3.2 COLOURS

- .1 Colours to match adjacent surfaces.
- .2 Selection of colours will be from manufacturer's full range of colours.
- .3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .4 Second coat in a three coat repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

3.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed with Contract Administrator written permission.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer' instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Contract Administrator.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

3.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI gloss / sheen standard values:

Gloss Level Category	Units @ 60°	Units @ 85°
G1 - matte finish	0 to 5	maximum 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	minimum 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of repainted surfaces shall be as specified herein.

3.5 INTERIOR PAINTING SYSTEMS

- .1 The following paint formulas requires a two coat finish as indicated in the MPI Repainting Maintenance Manual.
- .2 RIN 3.2 - Concrete Horizontal Surfaces: (floors and stairs, etc.).
 - .1 RIN 3.2A - Latex Floor Enamel G4.
- .3 RIN 4.1 - Clay Masonry Units: (pressed and extruded brick).
 - .1 RIN 4.1A - Latex G4 finish.
- .4 RIN 4.2 - Concrete Masonry Units: (Concrete Block and Concrete Brick).
 - .1 RIN 4.2A - Latex G4 finish.
- .5 RIN 5.1 - Structural Steel and Metal Fabrications.
 - .1 RIN 5.1K - 2 Component Epoxy finish.
- .6 RIN 5.3 - Galvanized Metal: (High Contact/High Traffic Areas (Doors, Frames, Railings, Pipes, Handrails, etc.). Low Contact/Low traffic areas (Overhead Decking, Pipes, Ducts, etc.)
 - .1 RIN 5.3C - Alkyd G5 finish.
- .7 RIN 6.2 - Dimension Lumber: (Columns, Beams, Exposed Joists, Underside of Decking, etc.)

- .1 RIN 6.2A - Latex G4 (over latex primer).
- .8 RIN 6.3 - Dressed Lumber: (Including Doors, Door and Window Frames, Mouldings, etc.)
 - .1 RIN 6.3A - Latex G5 finish.
- .9 RIN 6.5 - Wood Floors and Stairs: (Including Hardwood Flooring).
 - .1 RIN 6.5A - Alkyd Floor Enamel G4 (over primer).
- .10 RIN 9.2 - Plaster and Gypsum Board: (gypsum wallboard, drywall, "sheet rock type material", etc.,
 - .1 RIN 9.2A - Latex G5 (over latex sealer) for walls.
 - .2 RIN 9.2A - Latex G1 (over latex sealer) for ceilings.

Part 4 Execution

4.1 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Maintenance Repainting Manual requirements except where otherwise specified.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

4.2 EXISTING CONDITIONS

- .1 Prior to commencing work, thoroughly examine site conditions and existing interior substrates to be repainted. Report in writing to Contract Administrator damages, defects, or unsatisfactory or unfavourable conditions or surfaces that will adversely affect this work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Contract Administrator. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Concrete: 12%.
 - .2 Clay and Concrete Block/Brick: 12%.
 - .3 Wood: 15%.
- .4 No repainting work shall commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable. Commencement of work shall not be held to imply acceptance of surfaces except as qualified herein.
- .5 DSD shall be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

Condition	Description
DSD-0	Sound Surface (includes visual (aesthetic) defects that do not affect film's protective properties).
DSD-1	Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes scratches, etc.).
DSD-2	Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, staining, etc.).
DSD-3	Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges).

Condition	Description
DSD-4	Substrate Damage (repair or replacement of surface required by others).

4.3 PROTECTION

- .1 Protect existing surfaces and adjacent fixtures and furnishings from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Contract Administrator.
- .2 Cover or mask windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.
- .3 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .4 Protect factory finished products and equipment.
- .5 Protect general public and building occupants in and about the building.
- .6 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and surface mounted equipment, fittings and fastenings prior to undertaking re-painting operations. Items shall be securely stored and reinstalled after painting is completed.
- .7 Move and cover furniture and portable equipment as necessary to carry out repainting operations. Replace as painting operations progress.
- .8 As repainting operations progress, place "WET PAINT" signs in occupied areas to approval of Contract Administrator.

4.4 CLEANING AND PREPARATION

- .1 Clean and prepare interior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and surface debris by vacuuming, wiping with a dry, clean cloth or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and to dry thoroughly. Allow sufficient drying time and test surfaces using an electronic moisture meter before commencing work.
 - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
 - .6 Many water-based paints cannot be removed with water once dried. Minimize the use of kerosene or such organic solvents to clean up water-based paints.
- .2 Where required, pressure wash exterior surfaces prior to repainting in accordance with MPI standards for type of surfaces and recommended pressures to ensure complete removal of loose paint, stains, dirt, and foreign matter. This work to be carried out by qualified tradesman experienced in pressure water cleaning. Use of spray equipment such as water hose cleaning will not be considered satisfactory unless specified herein.

Allow sufficient drying time and test surfaces using an electronic moisture meter before commencing work.

- .3 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .5 Do not apply paint until prepared surfaces have been accepted by Contract Administrator.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

4.5 APPLICATION

- .1 Method of application to be as approved by Contract Administrator. Apply paint by brush, roller, air sprayer, airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application by either continuous mechanical agitation or intermittent agitation frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Back roll spray applications and brush out runs and sags immediately.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Contract Administrator.
- .5 Apply paint coats in a continuous manner and allow surfaces to dry and properly cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats shall not be less than that recommended by the manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.

- .6 Sand and dust between coats to remove visible defects.
- .7 Repaint surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .8 Repaint top, bottom, and vertical edges of doors to be repainted.
- .9 Repaint inside of cupboards and cabinets as specified for outside surfaces.
- .10 Repaint closets and alcoves to match existing, unless otherwise noted.

4.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise noted, repainting shall also include exposed to view / previously painted and new mechanical and electrical equipment and components (panels, conduits, piping, hangers, ductwork, etc.) in office/administration areas.
- .2 Paint new fire protection piping and electrical conduits as required for identification.
- .3 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour, and sheen finish to match existing unless otherwise noted or scheduled.
- .4 Do not paint over name plates or instruction labels.
- .5 Leave unfinished exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish.
- .6 Keep sprinkler heads free of paint.

4.7 FIELD QUALITY CONTROL

- .1 Field inspection of exterior painting operations to be carried out by Contract Administrator.
- .2 Advise Contract Administrator when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .3 Co-operate with Contract Administrator and provide access to areas of work.

4.8 CLEAN UP

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
- .3 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- .4 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
- .5 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction and as noted herein.

- .6 Painting equipment shall be cleaned in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations shall be recycled or disposed of in a manner acceptable to authorities having jurisdiction.
- .7 Paint and coatings in excess of repainting requirements shall be recycled as noted herein.

4.9 RESTORATION

- .1 Clean and reinstall hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashes on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Contract Administrator. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Contract Administrator.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 The work of this section includes the provision of all design, labour, materials, equipment and services required to:
 - .1 Fabricate new fixed interior partions around sprinkler trees in 552 Plinguet North;
 - .2 Patch and repair existing fixed interior partitions, and
 - .3 Install firestopping.
- .2 Coordinate work of this section with other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections.

1.2 RELATED SECTIONS

- .1 09 50 00 – Ceiling Finishes
- .2 09 01 00 – Paint Finishes
- .3 21 00 00 - Fire Protection Sprinkler Systems

1.3 REFERENCES

- .1 Government of Manitoba
 - .1 Manitoba Regulation 31/2011, Manitoba Building Code
 - .2 Manitoba Regulation 96/2012, Manitoba Electrical Code
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN-S115, Fire Tests of Firestop Systems.
- .3 Canadian Standards Association (CSA)
 - .1 CSA A23.1-09/A23.2-09 (R2014), Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete
 - .2 CSA A82.27-M91, Gypsum Board
 - .3 CSA A82.30-M1980, Interior Furring, Lathing, and Gypsum Plastering
 - .4 CSA A82.31-M1980, Gypsum Board Application
 - .5 CAN/CSA-A82.31-M91, Gypsum Board Application
 - .6 CSA S136-12, North American Specification for the Design of Cold-Formed Steel Structural Members
 - .7 CAN3-A165 Series-04 (R2014), CSA Standards on Concrete Masonry Units
 - .8 CSA A179-04 (R2014), Mortar and Grout for Unit Masonry
 - .9 CAN/CSA A371-04 (R2014), Masonry Construction for Buildings
 - .10 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement
 - .11 CAN/CSA A370-04, Connectors for masonry
 - .12 CSA S304.1-04 (R2010), Design of Masonry Structures
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound, One Component, Elastomeric, Chemical Curing
 - .2 CAN/CGSB 19.24-M90, Multicomponent, Chemical-curing Sealing Compound

- .3 CGSB 19-GP-5M, Sealing Compound, One Component, Acrylic Base, Solvent Curing
- .4 CGSB-19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing
- .5 ASTM
 - .1 ASTM C645-14, Standard Specification for Nonstructural Steel Framing Members
 - .2 ASTM A653/A653M-13, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.
- .3 Submit manufacturer's engineering judgement identification number and drawing details when no ULC or cUL system is available. Engineering judgement must include both project name and Contractor's name who will install firestop system as described in drawing.
- .4 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation. Include manufacturer's specifications, training letter, and technical data for each material including the composition and limitations, documentation of ULC or CUL firestop systems to be used.
- .5 Submit material safety data sheets provided with product delivered to job site.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: person specializing in fire stopping installations with minimum five (5) years documented experience approved by the fire stopping manufacturer.
 - .2 Manufacturer: company with minimum five (5) years experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.
 - .3 All fire stopping materials for this project to be supplied by a single manufacturer.

Part 2 Design

2.1 GENERAL

- .1 Where an assembly is required to have a fire resistance rating, the assembly rating shall be based on tested assemblies from NRC, ULC, UL, or WH or determined using the supplement to the MBC.
- .2 Provide hard, durable, and washable partition systems in public corridors, stairwells, entrances and lobbies. Use abuse/vandal-resistant gypsum board and/or concrete block partition systems, particularly at levels from finished floor to 2200mm above finished floor. Material selection to match adjacent surface.

2.2 INTERIOR STUD WALL

- .1 Design systems to provide structural support for wall cladding and to meet the general guidelines of this section.

2.3 MASONRY WALL

- .1 Design in accordance with CAN/CSA A371-04 (R2014), Masonry Construction for Buildings

2.4 SEALANT

- .1 Select to suit particular conditions of the job, with careful adherence to the manufacturer's instructions for application.
- .2 Do not use sealant to hide or make up for design or construction errors or faults.
- .3 Provide sealant colour to match adjacent surfaces. Provide sealant resistant to ultraviolet degradation or fading.
- .4 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

2.5 FIRESTOPPING

- .1 Use only ULC, UL, WH, and NRC/IRC certified systems. Use tested assemblies or as determined by standard calculation method.
- .2 Fire-resistance rating of installed fire-stopping assembly not less than the fire-resistance rating of surrounding floor and wall assembly.
- .3 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal. Do not use cementitious or rigid seal at such locations.
- .4 Fire stopping and smoke seals at openings around penetrations for pipes and other mechanical items requiring sound and vibration control: elastomeric seal. Do not use a cementitious or rigid seal at such locations.

Part 3 Products

3.1 INTERIOR STUD WALL

- .1 Framing
 - .1 Non-loadbearing channel stud framing: to ASTM C645-14, stud size as required, roll formed from 0.53mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board and lath. Knock-out service holes at 460mm centers.
 - .2 Floor and ceiling tracks: to ASTM C645-14, in widths to suit stud sizes, 32mm flange height.
 - .3 Loadbearing channel stud framing to CSA S136-M84, 152mm deep, 0.91mm thickness, galvanized steel studs with 31.0mm return 152 deep, 0.91mm thick galvanized tracks flange 40mm.
 - .4 Shaft wall studs, size as required, electro galvanized steel, for screw attachment of gypsum board and shaft wall liner panels, c/w top and bottom tracks to suit studs.

- .5 Metal channel stiffener: 38 x 19mm size, 1.4mm thick cold rolled steel, coated with rust inhibitive coating.
- .2 Interior Gypsum Board
 - .1 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M1980, galvanized.
 - .2 Standard board: to CSA A82.27-M1977 regular, and Type X, and 15.9mm thick (16mm) min., 1200 mm wide x maximum practical length, ends square cut, edges beveled.
 - .3 Water resistant board: to CSA A82.27-M1977 regular, 15.9mm thick min., 1200mm wide x maximum practical length.
 - .4 Shaft liner panels: to CSA A82.27-M, Type X, thickness as required, 610mm wide x maximum practical length, edges double beveled.
 - .5 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M1980 galvanized.
 - .6 Drywall furring channels: 0.5mm galvanized steel
 - .7 Screws: to CAN/CSA-A82.31-M91.
 - .8 Casing beads, comer beads: commercial grade sheet steel with Z275 zinc finish to ASTM A653/A653M-13, perforated flanges. One-piece length per location.
 - .9 Acoustic sealant: to CAN/CGSB-19.21-M87.
 - .10 Joint compound: to CAN/CSA-A82.31-M91, asbestos-free.
 - .11 Outside corner trim: extruded aluminium.
 - .12 Wall reveal trim: extruded aluminium.

3.2 SEALANTS

- .1 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for all joint sealants. Where sealants are qualified with primers, use only these primers.
- .2 Between door frames and walls, back of counter tops at walls, interior glazing sealant, perimeter of drinking fountain, mechanical access panels, acoustic seals: CGSB 19-GP-5M.
- .3 Primers: type recommended by sealant manufacturer.

3.3 FIRESTOPPING

- .1 Use only firestop products that have been ULC or cUL tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire-rating involved for each separate instance.
- .2 Fire stopping and smoke seal systems: in accordance with CAN-S115.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN-S115 and not to exceed opening sizes for which they are intended.
 - .2 Firestop system rating: as indicated on drawings and installations.
- .3 Service penetration assemblies: certified and tested by ULC or cUL in accordance with CAN-S115.
- .4 Service penetration firestop components: certified and tested by ULC or cUL in accordance with CAN-S115.

- .5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .6 Non-curing, re-penetrable intumescent sealants, caulking or putty material for use with flexible cables or cable bundles.
- .7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal. Consult with Contract Administrator and damper manufacturer prior to installation ULC or cUL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
- .8 Intumescent sealants or caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. No silicone based firestop are allowed to be applied on plastic pipes.
- .9 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .10 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .11 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .12 Sealants for vertical joints: non-sagging.

Part 4 Execution

4.1 INTERIOR STUD WALL

- .1 Framing
 - .1 Align partition tracks at floor and ceiling and secure at 600mm o.c. maximum.
 - .2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
 - .3 Place studs vertically at 400mm o.c. and not more than 50mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
 - .4 Erect metal studding to tolerance of 1:1000.
 - .5 Attach studs to bottom ceiling track using screws.
 - .6 Provide two studs extending from floor to ceiling at each side of openings wider than stud centers specified. Secure studs together, 50mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
 - .7 Install heavy gauge single jamb studs at openings.
 - .8 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
 - .9 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
 - .10 Provide 40mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

- .11 Extend partitions to ceiling height except where acoustic performance requires partitions to be continuous to underside of structure.
 - .12 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50mm leg ceiling tracks.
 - .13 Install continuous insulating strips to isolate studs from uninsulated surfaces.
 - .14 Install two continuous beads of acoustical sealant and insulating strip under studs and tracks around perimeter of partitions.
 - .15 Make provision within steel stud and furring to accommodate control joints to occur within drywall systems at abutting structural elements, at dissimilar walls or ceilings, at changes of substrate, at expansion joints within the structure, at approximately 10m in partition and wall runs, at 15m on large unbroken ceilings/bulkhead.
- .2 Interior Gypsum Board
- .1 Install gypsum board in accordance with CAN/CSA-A82.31-M1980 or as required.
 - .2 Install work level to tolerance of 1:1200.
 - .3 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
 - .4 Construct control joints of preformed units or two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.
 - .5 Provide continuous polyethylene dust barrier behind and across control joints.
 - .6 Locate control joints at changes in substrate construction, at approximate 10 m spacing on long corridor runs and at approximate 10m spacing on ceilings.
 - .7 Construct expansion joints, at building expansion and construction joints.
 - .8 Provide continuous dust barrier.
 - .9 Rigidly secure frames to furring or framing systems.
 - .10 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

4.2 SEALANTS

- .1 Apply and cure sealant in accordance with manufacturer's instructions.
- .2 Install backer rod to provide joint design of 1/3 depth to width ratio.
- .3 Tool sealant to a smooth concave finish.

4.3 FIRESTOPPING

- .1 Preparation
 - .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.
 - .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
 - .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
 - .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.
- .2 Installation

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification or UL Products Certified for Canada (CUL) and manufacturer's instructions.
 - .2 Seal holes or voids made by through penetrations, poke-through termination devices, and un-penetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
 - .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
 - .4 Tool or trowel exposed surfaces to a neat finish.
 - .5 Remove excess compound promptly as work progresses and upon completion.
- .3 Inspection
- .1 Notify Contract Administrator when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.
- .4 Schedule
- .1 Firestop and smoke seal at:
 - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
 - .2 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
 - .3 Openings and sleeves installed for future use through fire separations.
 - .4 Around mechanical and electrical assemblies penetrating fire separations.

4.4 CLEAN UP

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 The work of this section includes the provision of all design, labour, materials, equipment and services required to install ceiling finishes as required for a complete project. The work includes, but is not necessarily limited to, the items referenced herein:
 - .1 Suspended acoustic tile ceiling system
 - .2 Gypsum board on suspended metal furring system.
- .2 Coordinate work of this section with other sections as required to properly execute the work and as necessary maintain satisfactory progress of the work of other sections.

1.2 RELATED SECTIONS

- .1 09 01 00 – Paint Finishes
- .2 21 00 00 - Fire Protection Sprinkler Systems
- .3 26 31 01 – Fire Alarm Systems

1.3 REFERENCES

- .1 Government of Manitoba
 - .1 Manitoba Regulation 31/2011, Manitoba Building Code
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C635, Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
 - .2 ASTM C636-86, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- .3 Standards Council of Canada
 - .1 CAN/CGSB-92.1-M77, Acoustical Units, Prefabricated
 - .2 CAN4-S102-M88, Surface Burning Characteristics of Building Materials

1.4 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

Part 2 Design

2.1 GENERAL

- .1 Provide water-resistant gypsum board to all ceiling areas susceptible to moisture or water such as washrooms and locker rooms.
- .2 Comply with the flame spread requirements of the Manitoba Building Code.
- .3 Provide finishes which are compatible and consistent with each other to suit the level of finish specified in this section. Select from readily available stock from suppliers with a proven delivery record.
- .4 Use ULC listed assembly for design of fire rated floor/ceiling and roof/ceiling.
- .5 Completed suspension system to support superimposed loads.
- .6 Maximum deflection of suspended acoustical ceiling assembly: 1/360th of span to ASTM C635 deflection test.
- .7 Design independent suspension systems at expansion joints.

Part 3 Products

3.1 ACOUSTICAL CEILING SYSTEMS

- .1 Intermediate duty system.
- .2 Basic materials for suspension system: commercial quality cold rolled steel, zinc coated. Suspension system: non fire-rated, two directional exposed tee bar grid.
- .3 Exposed tee bar grid components: shop painted satin sheen, white colour. Components die cut. Main tee with double web, rectangular bulb and 25mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .4 Acoustic units for suspended ceiling system: to CAN2-92.1.
- .5 Flame spread rating of 25 or less. Smoke developed 0 - 25 or less.
- .6 Noise reduction coefficient (NRC) designation of .50 - .60.
- .7 Light reflectance range of 75%. Colour: white.
- .8 Size 610 x 1220 x 19mm thick or to match existing grids and lights.
- .9 Fire stopping and smoke seal systems: in accordance with CAN-S115.
- .10 Light diffusers for valances: white aluminum egg crate type 10 x 10 x 10mm deep.
- .11 Carrying channels: 38 x 25mm channel of 1.2mm thick galvanized steel.
- .12 Accessories: splices, clips, wire ties, retainers and wall moulding, reveal to complement suspension system components, as recommended by system manufacturer.
- .13 Hold down clips: purpose made to secure tile to suspension system, approved for use in fire rated assemblies.

3.2 INTERIOR GYPSUM BOARD

- .1 Do work in accordance with CSA A82.31-M1980 or as required.
- .2 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30-M1980, galvanized.
- .3 Standard board: to CSA A82.27-M1977 regular, and Type X, 12.7mm thick (13mm) and 15.9mm thick (16mm), 1200 mm wide x maximum practical length, ends square cut, edges beveled.
- .4 Water resistant board: to CSA A82.27-M1977 regular, 15.9mm thick, 1200mm wide x maximum practical length.
- .5 Screws: to CAN/CSA-A82.31-M91.
- .6 Casing beads, comer beads: commercial grade sheet steel with Z275 zinc finish to ASTM A 525-93, perforated flanges. One-piece length per location.
- .7 Acoustic sealant: to CAN/CGSB-19.21-M87.
- .8 Joint compound: to CAN/CSA-A82.31-M91, asbestos-free.
- .9 Outside corner trim: extruded aluminium 19mm radius corner trim.
- .10 Wall reveal trim: extruded aluminium 12mm wide reveal moulding trim.
- .11 Access doors: Panels of bonderized steel prime painted. 1.5mm thick frame, 1.9 mm thick door, flush door hinge design.

Part 4 Execution

4.1 ACOUSTICAL CEILING SYSTEMS

- .1 Installation: in accordance with ASTM C636-86 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions.
- .3 Do not erect ceiling suspension system until work above ceiling has been inspected.
- .4 Secure hangers to overhead structure using acceptable attachment methods.
- .5 Install hangers spaced at maximum 1200mm centres and within 150mm from ends of main tees.
- .6 Ensure suspension system is coordinated with location of related components.
- .7 Completed suspension system to support superimposed loads, such as lighting fixtures, diffusers, grilles and speakers.
- .8 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150mm of each corner and at maximum 600mm around perimeter of fixture.
- .9 Interlock cross member to main runner to provide rigid assembly.
- .10 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

- .11 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .12 Coordinate ceiling work to accommodate components such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.
- .13 In areas with existing suspension systems reinstall existing acoustic units. Replace damaged or stained acoustic units with new matching units.

4.2 INTERIOR GYPSUM BOARD

- .1 Install gypsum board in accordance with CAN/CSA-A82.31-M31 or as required.
- .2 Install work level to tolerance of 1:1200.
- .3 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .4 Construct control joints of preformed units or two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.
- .5 Provide continuous polyethylene dust barrier behind and across control joints.
- .6 Locate control joints at changes in substrate construction, at approximate 10 m spacing on long corridor runs and at approximate 10m spacing on ceilings.
- .7 Construct expansion joints, at building expansion and construction joints. Provide continuous dust barrier.
- .8 Rigidly secure frames to furring or framing systems.
- .9 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

4.3 CLEAN UP

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove excess materials and debris and clean adjacent surfaces immediately after application.

END OF SECTION

Part 1 General

1.1 Scope of Work

- .1 Design and install fire suppression systems to meet code requirements and functional criteria for the City of Winnipeg Water and Waste Department facilities at 552 Plinguet.

1.2 References

- .1 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
 - .1 ANSI/NFPA 13, Standard for the Installation of Sprinkler Systems
 - .2 ANSI/NFPA 24, Installation of Private Fire Service Mains and Their Appurtenances
 - .3 ANSI/NFPA 25, Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems
- .2 American Society of Mechanical Engineers (ASME)
 - .1 ASME B1.20.1, Pipe Threads, General Purpose (Inch)
 - .2 ASME B16.21, Nonmetallic Flat Gaskets for Pipe Flanges
 - .3 ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings
 - .4 ASME B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
 - .2 ASTM A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
 - .3 ASTM A153/A153M, Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
 - .4 ASTM A197/A197M, Standard Specification for Cupola Malleable Iron
 - .5 ASTM A-234, Standard Specification for Piping Fittings for Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
 - .6 ASTM A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
 - .7 ASTM A-536, Standard Specification for Ductile Iron Castings
 - .8 ASTM A733, Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
 - .9 ASTM A795/A795M, Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use
 - .10 ASTM A865/A865M, Standard Specification for Threaded Couplings, Steel, Black or Zinc-Coated (Galvanized) Welded or Seamless, for Use in Steel Pipe Joints
 - .11 ASTM B88, Standard Specification for Seamless Copper Water Tube
 - .12 ASTM B88M, Standard Specification for Seamless Copper Water Tube (Metric)
- .4 American Welding Society
 - .1 AWS A5.8M/A5.8 Specification for Filler Metals for brazing and Braze Welding
- .5 American Water Works Association
 - .1 AWWA C110, Ductile-Iron and Gray-Iron Fittings
- .6 Standards Council of Canada/Underwriter's Laboratories of Canada (CAN/ULC)

- .1 CAN/ULC S543, Standard for Internal Lug Quick Connect Coupling for Fire Hose
- .7 Underwriter's Laboratories (UL)
 - .1 UL 193, Standard for Alarm Valves for Fire-Protection Service
 - .2 UL 199, Standard for Automatic Sprinklers for Fire-Protection Service
 - .3 UL 213, Standard for Rubber Gasketed Fittings for Fire-Protection Service
 - .4 UL 213C, Standard for Grooved and Plain End Fittings
 - .5 UL 258, Outline of Investigation for Shutoff Valves for Trim and Drain Purposes
 - .6 UL 260, Standard for Dry Pipe and Deluge Valves for Fire-Protection Service
 - .7 UL 262, Standard for Gate Valves for Fire-Protection Service
 - .8 UL 312, Standard for Check Valves for Fire-Protection Service
 - .9 UL 346, Standard for Waterflow Indicators for Fire Protective Signaling Systems
 - .10 UL 464, Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories
 - .11 UL 1091, Standard for Butterfly Valves for Fire-Protection Service
 - .12 UL 1474, Standard for Adjustable Drop Nipples for Sprinkler Systems
 - .13 UL 1726, Standard for Automatic Drain Valves for Standpipe Systems

1.3 Related Work

- .1 Section 26 31 01 –Fire Alarm Systems
- .2 Section 33 00 00 – Water Supply and Distribution Systems

1.4 Submittals

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Design and Construction Documents
 - .1 Submit detailed hydraulic calculations and construction drawings for review prior to construction.
 - .2 Prepare fire suppression system drawings in accordance with the City of Winnipeg Drafting Standards Manual in Appendix A, National Building Code requirements and applicable NFPA installation standards.
 - .3 Submitted Building Fire Protection Plans, Sections and Schematics to be drawn to an indicated scale and include the following information at a minimum:
 - .1 Name and address of building,
 - .2 North arrow,
 - .3 Full height cross section, including structural member information and ceiling construction,
 - .4 Location of partitions,
 - .5 Location of fire walls,
 - .6 Occupancy class of each area or room,
 - .7 Location and size of concealed spaces, closets, attics and bathrooms,
 - .8 Any small enclosures in which no sprinklers are to be installed,
 - .9 Make, type, model and nominal K-factor of sprinklers including sprinkler identification number,
 - .10 Temperature rating and location of high-temperature sprinklers,
 - .11 Total area protected by each zone,
 - .12 Number of sprinklers on each riser per floor,

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- .13 Total number of sprinklers on each dry pipe system, pre-action system, or combined dry pipe-preaction system,
 - .14 Approximate capacity in litres (gallons) of each dry pipe system,
 - .15 Pipe type and schedule of wall thickness,
 - .16 Nominal pipe size and cutting lengths of pipe (or centre-to-centre dimensions). Where typical branch lines prevail, size only one typical line,
 - .17 Location and size of riser nipples,
 - .18 Type of fittings and joints and location of all welds and bends,
 - .19 Specify any sections to be shop welded and the type of fittings or formations to be used,
 - .20 Type and locations of hangers, sleeves, braces and methods of securing sprinklers when applicable,
 - .21 All control valves, check valves, drain pipes, and test connections,
 - .22 Make, type, model and size of alarm valve, dry valve and preaction valve,
 - .23 Kind and location of alarm bells,
 - .24 Size and location of standpipe risers, hose outlets, hand hose, monitor nozzles and related equipment,
 - .25 Piping provisions for flushing,
 - .26 The information on the hydraulic data nameplate,
 - .27 A graphic representation of the scale used on all plans,
 - .28 Name and address of Contractor,
 - .29 Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculation sheets,
 - .30 The minimum rate of water application (density or flow or discharge pressure), the design area of water application, in-rack sprinkler demand, and the water required for hose streams both inside and outside,
 - .31 The total quantity of water and the pressure required noted at a common reference point for each system,
 - .32 Relative elevations of sprinklers, junction points, and supply or reference points,
 - .33 Information about backflow preventers,
 - .34 Information about antifreeze solution used (type and amount),
 - .35 Size, location, and piping arrangement of fire department connections,
 - .36 Ceiling/roof heights and slopes not shown in the full height cross section,
 - .37 Edition year of NFPA 13 that the sprinkler system is designed to,
 - .38 Signed and dated seal of the design engineer licenced to practice in the province of Manitoba,
 - .39 Show details and listing numbers of fire stop systems used at all penetrations, and
 - .40 Details of new building water service installation showing size of frost culvert, anchor, restraining method, pipe material and water service connection detail.
- .4 The civil site plan to be drawn to an indicated scale and include the following information at a minimum:
- .1 Name and address of site,
 - .2 North arrow,
 - .3 Signed and dated seal of the design engineer licenced to practice in the province of Manitoba,

- .4 Size and location of hydrants, showing size and number of outlets and if outlets are to be equipped with independent gate valves,
- .5 A graphic representation of the scale used,
- .6 Indicate the static and residual hydrants that were used in flow tests,
- .7 Locations of fire department connections, and
- .8 Size of water mains and whether dead end or circulating, if dead end, direction and distance to nearest circulating main.
- .5 Prepare and submit hydraulic calculations on form sheets that include a summary sheet, a graph sheet and water supply analysis, a node analysis and detailed worksheets.
 - .1 The Summary Sheet shall contain the following information, where applicable:
 - .1 Project name and date
 - .2 Location (including street address and building name)
 - .3 Drawing number
 - .4 Remote area number
 - .5 Occupancy or commodity classification
 - .6 System design requirements:
 - .1 Design area of water application, m² (ft²)
 - .2 Minimum rate of water application, mm/min (gpm/ft²)
 - .3 Area per sprinkler (ft²)
 - .7 Total water requirements as calculated, including allowance for inside hose, outside hydrants, water curtain and exposure sprinklers, and allowance for in-rack sprinklers, L/min (gpm)
 - .8 Type of system and, if dry or preaction, the volume of the system in litres (gallons)
 - .9 Water supply information including: date; location; source and elevation relative to finished floor
 - .10 Name and address of Contractor
 - .11 Name of Engineer
 - .12 Authority having jurisdiction
 - .13 Notes that include items such as peaking information for calculations performed by a computer program, limitations (dimensions, flow and pressure) on extended coverage or other listed special sprinklers.
 - .2 Graph Sheet shall be a graphical representation of the hydraulic calculation and shall include the following:
 - .1 Water supply curve
 - .2 Sprinkler system demand
 - .3 Hose demand
 - .4 In-rack sprinkler demand
 - .5 Additional pressures supplied by a fire pump or other source
 - .3 Supply Analysis
 - .4 Node Analysis
 - .5 Detailed Worksheets
- .3 Shop drawings:
 - .1 Shop drawings: submit drawings stamped and signed by designer registered and acceptable to the authority having jurisdiction.

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- .2 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
 - .3 Submit shop drawings for the following:
 - .1 Sprinkler heads
 - .2 Pressure gauges
 - .3 Valves
 - .4 Fire department connections
 - .5 Supervisory switches
 - .6 Alarm valve and components
 - .7 Pumps
 - .8 Relief valves
 - .4 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .5 Test reports:
 - .1 Submit certified test reports for wet pipe fire protection sprinkler systems from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.
 - .4 Manufacturer's Field Reports: manufacturer's field reports specified.
 - .6 Closeout Submittals:
 - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Contract Administrator before final inspection.
 - .3 Operation data to include:
 - .1 Description of systems.
 - .2 Description of operation of systems.
 - .3 Operation instruction for systems and component.
 - .4 Description of actions to be taken in event of equipment failure.
 - .5 Valves schedule and flow diagram.
 - .6 Colour coding chart.
 - .4 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
 - .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after Total Performance.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .6 Approvals:

- .1 Submit one copy of draft Operation and Maintenance Manual to the Contract Administrator for approval. Submission of individual data will not be accepted unless directed by the Contract Administrator.
- .2 Make changes as required and re-submit as directed by the Contract Administrator.
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
 - .1 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .2 Use different colour for each service.
 - .3 Make available for reference purposes and inspection.
- .9 As-built drawings:
 - .1 Prior to testing of the fire suppression system, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW FIRE SUPPRESSION SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Contract Administrator for approval and make corrections as directed.
 - .4 Perform testing for fire suppression systems using as-built drawings.
- .10 Record drawings:
 - .1 Submit completed reproducible record drawings with Operating and Maintenance Manuals.

Part 2 Design

2.1 FUNCTIONAL CRITERIA

- .1 The minimum design area for an automatic sprinkler system shall be 1,500 square feet unless bounded on all sides by either a 2-hour fire-rated interior barrier or exterior walls. Hydraulically designed systems shall be designed at least 10 psig or 10% (whichever is greater) below the water supply curve.
- .2 Provide a hydraulically designed automatic sprinkler system for protection of an NFPA 13, Standard for the Installation of Sprinkler Systems.
- .3 Provide a separate fire protection service line inside the building.
- .4 Provide backflow preventers on all new fire protection system risers.
- .5 Provide sprinkler systems with a minimum number of control valves.
- .6 Sprinkler systems shall be monitored by a fire alarm system, refer to Division D5.
- .7 Provide a minimum of 380 L/min for hose stream allowance for water-based fire suppression systems, unless otherwise required.

- .8 Provide an initiating alarm device (sprinkler system flow or pressure switch) for each area of the building protected by sprinklers, to assist the Fire Department in determining the location of a fire during an emergency.
- .9 Water Supply:
 - .1 Static Pressure: 458 kPa (66.5 psi)
 - .2 Flow: 47.25 l/s at 400 kPa (750 USgpm at 58 psi)
- .10 The following NFPA 13 occupancy hazard density requirements, unless otherwise specified, are:
 - .1 **Light Hazard Occupancies**
 - .1 Sprinkler water supply density: 4.1 mm/min (0.10 usgpm/ft²) for ceiling heights up to 9 metres (30 feet)
 - .2 Hydraulically most remote area: 139 m² (1,500 ft²)
 - .3 Hose stream demand: 380 L/min (100 usgpm).
 - .4 Spaces: Administrative areas including offices, lunchrooms, washrooms, computer rooms
 - .2 **Ordinary Hazard Group 1 Occupancies**
 - .1 Sprinkler water supply density: 6.1 mm/min (0.15 usgpm/ft²)
 - .2 Hydraulically most remote area: 139 m² (1,500 ft²)
 - .3 Hose stream demand: 950 L/min (250 usgpm).
 - .4 Spaces: Mechanical rooms, electrical rooms, janitor closets
 - .3 **Ordinary Hazard Group 2 Occupancies**
 - .1 Sprinkler water supply density: 8.1 mm/min (0.20 usgpm/ft²)
 - .2 Hydraulically most remote area: 139 m² (1,500 ft²)
 - .3 Hose stream demand: 950 L/min (250 usgpm).
 - .4 Spaces: Garages, Storerooms,

Part 3 Products

3.1 Material

- .1 All materials used on this project shall be new and CSA approved unless noted otherwise.

3.2 Pipe

	Service	Material
.1	Wet sprinkler system, aboveground	Schedule 40, black steel, ASTM A 53/A 53M, ASTM A135 or ASTM A795. Pipe ends may be factory or field formed to match joining method
.2	Dry sprinkler system, aboveground	Schedule 40, galvanized steel, ASTM A135, ASTM A 795A/A 795M, or ASME B36.10M. Pipe ends may be factory or field formed to match joining method
.3	Fire protection, copper tube	Hard Copper Tube: ASTM B 88, Type K (ASTM B 88M, Type B) water tube, drawn temper.
.4	Dry pipe fire protection systems: piping, fittings and accessories to be hot dipped galvanized to ASTM A153/A153M.	

3.3 FITTINGS AND JOINTS

	Service	Material	Joint
.1	Wet sprinkler system, above ground, NPS 2 and under	Fittings: ASME B16.3 Class 150, ASTM A-197/A-197M malleable iron Nipples: ASTM A733 made of ASTM A53/A53M or ASTM A106, schedule 40, seamless steel pipe Couplings: Steel to ASTM A865	Threads cut to ASME B1.20.1 Threads cut to ASME B1.20.1 Threads cut to ASME B1.20.1
.2	Dry sprinkler system, above ground, NPS 2 and under	Fittings: galvanized, gray-iron threaded: ASME B16.4, Class 125, standard pattern. Nipples: galvanized-steel pipe: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends. Couplings: ASTM A 865, galvanized steel	Threads cut to ASME B1.20.1 Threads cut to ASME B1.20.1 Threads cut to ASME B1.20.1
.3	Wet sprinkler system, above ground, NPS 2-1/2 and larger	Fittings: UL-listed, ASTM A536, ductile-iron casting with OD matching steel-pipe OD	Grooved mechanical for fire protection systems
.4	Dry sprinkler system, above ground, NPS 2-1/2 and larger	Fittings: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting.	Grooved mechanical for fire protection systems
.5	Fire protection, copper	Wrought copper to ASME B16.22 or cast copper to ASME B16.18	Brazed
.6	Use long radius elbows where available.		

3.4 Unions and Flanges

- .1 NPS 2 and under: Class 150 malleable iron, bronze to iron ground joint unions for threaded ferrous piping, galvanized for dry systems
- .2 NPS 2-1/2 and over: grooved mechanical flanges for fire protection systems

3.5 Pipe Joining Materials

- .1 Gaskets: AWWA C110, rubber, flat face, 3.2 mm (1/8 inch) thick or ASME B16.21 nonmetallic and asbestos free or EPDM rubber gasket. Full-face gaskets.
- .2 Bolts: carbon steel stud bolts, semi-flushed and heavy hex nuts, ASTM A307-GrB, unless otherwise indicated.
- .3 Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

3.6 Listed Fire Protection Valves:

- .1 ULC listed or FM approved for fire protection service.
- .2 Ball Valves:
 - .1 NPS 2 and under: bronze body, UL 258, threaded ends, pressure rating 2.1 MPa (300 psi) WWP.
 - .2 Manufacturers: Subject to compliance with requirements, available manufactures offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Anvil International
 - .2 Nibco, Inc.
 - .3 Victaulic Company
- .3 Iron Butterfly Valves:
 - .1 NPS 2 1/2 and over: cast or ductile iron body, lug style or roll grooved ends, UL 1091, pressure rating 1.2 MPa (175 psig).
 - .2 Manufacturers: Subject to compliance with requirements, available manufactures offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Tyco Fire & Building Products LP
 - .2 Nibco, Inc.
 - .3 Victaulic Company
- .4 Bronze Swing Check Valves:
 - .1 NPS 2 and under: Bronze body threaded ends, screw-in cap, renewable composition disc rating 300 psi W.O.G.
 - .1 Manufacturers: Subject to compliance with requirements, available manufactures offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Nibco, Inc.
 - .2 Viking Corporation
 - .3 Milwaukee Valve Company
- .5 Iron Swing Check Valves:
 - .1 NPS 2-1/2 and over: cast iron body, UL 312, flanged or grooved end connections, pressure rating 1.7 MPa (250 psig)
 - .1 Manufacturers: Subject to compliance with requirements, available manufactures offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co.
 - .2 Viking Corporation
 - .3 Victaulic Company
 - .2 Check valves serving fire department connections provide with rubber faced disc.
- .6 Bronze OS&Y Gate Valves:
 - .1 NPS 2 and under: bronze body, UL 262, threaded ends, pressure rating 1.2 MPa (175 psig).
 - .2 Manufacturers: Subject to compliance with requirements, available manufactures offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Milwaukee Valve Company

- .2 Nibco Inc.
- .3 United Brass Works, Inc.
- .7 Iron OS&Y Gate Valves:
 - .1 NPS 2-1/2 and over: cast or ductile iron, UL 262, flanged or grooved end connections, pressure rating 1.7 MPa (250 psig)
 - .2 Manufacturers: Subject to compliance with requirements, available manufactures offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Tyco Fire & Building Products LP
 - .2 Nibco Inc.
 - .3 Watts
- .8 Valve Supervisory Switches:
 - .1 Equip valves which control water to automatic sprinkler heads with supervisory switches.
 - .1 Provide valve supervisory switches with single pole double throw switching contacts, housed in gasketed, weather-tight enclosure, voltage suitable for fire alarm system.
 - .2 Supply supervisory device specifically designed to mount on, and operate reliably with, type of control valve being monitored.
 - .3 Adjust valve position switches to transmit a supervisory signal within two revolutions of valve operating hand wheel or crank (away from its full open position).
 - .4 Provide complete with two single pole, double throw supervisory switches pre-wired monitoring the open position, in weatherproof housing.
 - .5 Provide manual gear operator for quarter turn valves.
 - .6 Tamper devices to be wired back to fire alarm panel.
 - .7 Standard: UL 346
 - .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Fire-Lite Alarms, Inc.; a Honeywell International company.
 - .2 Potter Electric Signal Company, LLC.
 - .3 System Sensor.

3.7 Trim and Drain Valves

- .1 General Requirements:
 - .1 Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
 - .2 Pressure Rating: 175 psig minimum
- .2 Angle Valves:
 - .1 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Fire Protection Products, Inc.
 - .2 Nibco, Inc.
 - .3 United Brass Works, Inc.
- .3 Ball Valves:

- .1 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Anvil International; a subsidiary of Mueller Water Products, Inc.
 - .2 Conbraco Industries, Inc.
 - .3 Fire Protection Products, Inc.
- .4 Globe Valves:
 - .1 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Fire Protection Products, Inc.
 - .2 Nibco, Inc.
 - .3 United Brass Works, Inc.
- .5 Plug Valves:
 - .1 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Nibco, Inc.
 - .2 Southern Manufacturing Group.
 - .3 Watts.

3.8 Backflow Preventers

- .1 Standard: ASSE 1013 or AWWA C511.
- .2 Continuous-pressure applications, stainless steel body, grooved or flanged end connections, horizontal straight through flow, OS&Y gate valves or butterfly valves with grooved or flanged ends on inlet and outlet, air gap fitting to ASME A112.1.2 matching the backflow preventer connections.
- .3 Provide valve supervisory switches per item 3.6.8.
- .4 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Ames Fire & Waterworks
 - .2 Watts
 - .3 Zurn Industries, LLC

3.9 Specialty Valves

- .1 General Requirements:
 - .1 Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
 - .2 Pressure Rating: 1,205 KPa (175 psig) minimum.
 - .3 Body Material: Cast or ductile iron.
 - .4 Size: Same as connected piping.
 - .5 End Connections: Flanged or grooved.
- .2 Wet System

- .1 Alarm Valves:
 - .1 Standard: UL 193.
 - .2 Design: For horizontal or vertical installation.
 - .3 Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gauges, retarding chamber, and fill-line attachment with strainer.
 - .4 Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
 - .5 Drip Cup Assembly: Pipe drain with check valve to main drain piping.
 - .6 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co., Inc.
 - .2 Victaulic Company
 - .3 Viking Corporation.

- .3 Dry System:
 - .1 Alarm Valves:
 - .1 Standard: UL 260.
 - .2 Design: Differential –pressure type.
 - .3 Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
 - .4 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co., Inc.
 - .2 Victaulic Company
 - .3 Viking Corporation.

 - .2 Air-Pressure Maintenance Device:
 - .1 Standard: UL 260.
 - .2 Type: Automatic device to maintain minimum air pressure in piping. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 100 to 413 kPa (14- to 60-psig) adjustable range, and 1,250 kPa (175-psig) outlet pressure.
 - .3 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co., Inc.
 - .2 Victaulic Company
 - .3 Viking Corporation.

 - .3 Air Compressor
 - .1 Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
 - .2 Motor Horsepower: Fractional.
 - .3 Power: 120-V/1Ø/60 Hz

- .4 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Gast Manufacturing Inc.
 - .2 General Air Products, Inc.
 - .3 Viking Corporation
- .4 Automatic Drain Valves (Ball drip)
 - .1 NPS ¾: Brass or bronze body, UL 1726, threaded end connections, 1,205 kPa (175 psig) working pressure.
 - .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co., Inc.
 - .2 Victaulic Company
 - .3 Tyco Fire & Building Products LP.

3.10 Sprinkler Specialty Fittings

- .1 General requirements for dry pipe systems fittings: UL listed for dry pipe service.
- .2 Branch Outlet Fittings:
 - .1 Ductile iron housing with EPDM seals, UL 213, snap-on or strapless
 - .2 Branch outlets: grooved, plain-end or threaded.
 - .3 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Anvil International
 - .2 Tyco Fire & Building Products LP
 - .3 Victaulic Company
- .3 Flow Detection and Test Assemblies:
 - .1 Cast or ductile iron housing with orifice, sight glass and integral test valve, threaded connections, pressure rating 1,205 kPa (175 psig)
 - .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co., Inc.
 - .2 Tyco Fire & Building Products LP
 - .3 Victaulic Company
- .4 Branch Line Testers:
 - .1 Brass body, UL 199, threaded connections, capped drain outlet
 - .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Elkhart Brass Mfg. Co., Inc.
 - .2 Fire-End & Croker Corporation
 - .3 Potter Roemer LLC
- .5 Sprinkler Inspector's Test Fittings:

- .1 Cast or ductile iron body with sight glass, threaded connections, pressure rating 1,205 kPa (175 psig).
- .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 AGF Manufacturing Inc.
 - .2 Tyco Fire & Building Products LP
 - .3 Victaulic Company
- .6 Adjustable Drop Nipple:
 - .1 Steel pipe with EPDM-rubber O-ring seals, UL 1474, adjustable length, threaded inlet on outlet connections, pressure rating 1,720 kPa (250 psig).
 - .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Aegis Technologies, Inc.
 - .2 CECA, LLC
 - .3 Corcoran Piping System Co

3.11 Sprinkler Heads

- .1 General: to ANSI/NFPA 13 and ULC listed for fire protection services.
- .2 Finished Ceiling Type: semi-recessed pendant with escutcheon
 - .1 Finish:
 - .1 White or Off-white Ceilings: Enamel, colour white for sprinkler head, escutcheon and cover plates.
 - .2 Other Finished Ceilings: Chrome for sprinkler head, escutcheon and cover plates.
 - .2 Fusible Link: Glass bulb type temperature rated for specific area hazard.
- .3 Exposed Area Type: Standard upright type with guard.
 - .1 Finish: Brass.
 - .2 Fusible Link: Glass bulb type temperature rated for specific area hazard.
- .4 Sidewall Type: Standard Response or Quick Response Standard Coverage or Extended
 - .1 Coverage horizontal sidewall type with matching push on escutcheon plate and guard.
 - .2 Finish: Chrome.
 - .3 Escutcheon Finish: Chrome.
 - .4 Fusible Link: Fusible solder link type temperature rated for specific area hazard.
- .5 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Reliable Automatic Sprinkler Co., Inc. (The).
 - .2 Victaulic Company.
 - .3 Viking Corporation.
- .6 Guards: Chrome finish.
- .7 Specialty Type: as required for application.

3.12 Alarm Devices

- .1 Alarm devices types shall match piping and equipment connections.
- .2 Electrically Operated Alarm Bell:
 - .1 Type: Vibrating, metal alarm bell, 150 mm (6 inches) minimum diameter
 - .2 Finish: Red-enamel factory finish, suitable for outdoor use
 - .3 Standard: UL 464.
 - .4 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Fire-Lite Alarms, Inc.; a Honeywell International company.
 - .2 Notifier.
 - .3 Potter Electric Signal Company, LLC.
- .3 Pressure Switches:
 - .1 Standard: UL 346.
 - .2 Type: Electrically supervised water-flow switch with retard feature.
 - .3 Components: Single-pole, double-throw switch with normally closed contacts.
 - .4 Design Operation: Rising pressure signals water flow..
 - .5 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Potter Electric Signal Company, LLC.
 - .2 System Sensor.
 - .3 Tyco Fire & Building Products LP.

3.13 Fire Department Connection

- .1 Provide connections approximately 1.5 m above finish grade, location as indicated.
- .2 To ANSI/NFPA 13 and CAN/ULC S543 listed, Siamese type.
- .3 Polished bronze chrome plated recessed or exposed of approved two-way type with plug, chain, and identifying fire department connection escutcheon plate.
- .4 Thread specifications: compatible with City of Winnipeg Fire Department.
- .5 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 Potter Roemer
 - .2 Crocker
 - .3 Guardian Fire

3.14 Excess Pressure Pump

- .1 Provide pump on each sprinkler piping riser when system is subject to extreme water pressure fluctuations.
- .2 Pump and motor unit:

- .1 Approved for automatic wet pipe fire extinguishing sprinkler systems; complete with pilot light panel, differential motor control switch, high pressure switch, and low pressure switch.
- .2 NEMA Class B squirrel cage induction 1725 rpm, continuous duty, drip proof, ball bearing, maximum temperature rise 50 degrees C, 0.25 kW, 120/1Ø/60.
- .3 Capacity: 7.6 L/min.
- .3 Provide electrical power supply connections for pump and pilot light panel at supply side of building service panel.
- .4 Provide separate fused safety-type switch with locked lever for each connection.
- .5 Provide pressure pump sensing piping in supply piping upstream of fire pump.
- .6 Pump operation switch: to operate excess pressure pump with pressure differential of 103 kPa.
- .7 Shut-off valve and strainer on pump inlet. Relief valve, check valve and shut-off valve on discharge connections.

3.15 Pressure Gauges

- .1 Provide listed pressure gauges designed for use with air or water.
 - .1 Gauge Scale: Dial marking subdivision no finer than 1 percent of maximum scale reading and accurate to 3 percent or less. Provide minimum scale range twice the maximum working pressure (when possible).
- .2 Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - .1 AGF Manufacturing Inc.
 - .2 AMETEK, Inc.
 - .3 Ashcroft Inc.

3.16 Inspector's Test Connection

- .1 Locate inspector's test connection at hydraulically most remote part of each system, provide test connections approximately 3 m above floor for each sprinkler system or portion of each sprinkler system equipped with alarm device.
- .2 Provide test connection piping to location where discharge will be readily visible and where water may be discharged without property damage.
- .3 Provide discharge orifice of same size as corresponding sprinkler orifice.

3.17 Signs

- .1 Attach properly lettered English and approved metal signs to each valve and alarm device to ANSI/NFPA 13.
- .2 Permanently fix hydraulic design data nameplates to riser of each system.

3.18 Spare Parts Cabinet

- .1 For storage of maintenance materials, spare sprinkler heads and special tools.

- .2 Construct to sprinkler head manufacturers standard.

3.19 Pipe Sleeves

- .1 Provide pipe sleeves where piping passes through walls, floors, and roofs.
- .2 Secure sleeves in position and location during construction.
- .3 Provide sleeves of sufficient length to pass through entire thickness of walls, floors, and roofs.
- .4 Provide 25 Mm minimum clearance between exterior of piping and interior of sleeve or core-drilled hole.
 - .1 Firmly pack space with mineral wool insulation.
 - .2 Seal space at both ends of sleeve or core-drilled hole with plastic waterproof cement which will dry to firm but pliable mass, provide mechanically adjustable segmented elastomeric seal.
 - .3 In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with ULC listed fill, void, or cavity material.
- .5 Sleeves in masonry and concrete walls, floors, and roofs:
 - .1 Provide hot-dip galvanized steel, ductile-iron, cast-iron sleeves.
 - .2 Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in core-drilled hole are completely grouted smooth.
- .6 Sleeves in other than masonry and concrete walls, floors, and roofs:
 - .1 Provide 0.61 mm thick galvanized steel sheet.

3.20 Escutcheon Plates

- .1 Provide one piece split hinge type metal plates for piping passing through walls, floors, and ceilings in exposed spaces.
- .2 Provide polished stainless steel plates chromium-plated finish on copper alloy plates in finished spaces.
- .3 Provide paint finish on metal plates in unfinished spaces.

3.21 Pipe Hangers

- .1 ULC listed for fire protection services in accordance with NFPA.

Part 4 Execution

4.1 Manufacturer's Instructions

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

4.2 Installation

- .1 Install, inspect and test to acceptance in accordance with ANSI/NFPA 13, ANSI/NFPA 14 and NFPA 25.

- .2 Locate sprinkler heads at center lines of ceiling panels as required to produce orderly and symmetrical patterns with other ceiling mounted equipment and devices, and to meet or exceed the requirements of authority having jurisdiction.
- .3 Install pipe runs to avoid interference with structure, piping, lights, cable trays, ductwork and other equipment.
- .4 In areas with ceiling, run piping concealed above furred ceilings and in joists to minimize obstructions. Expose only sprinkler heads.
- .5 Provide sufficient sprinkler coverage above and below ductwork and other obstructions.
- .6 In electrical, IT and communication rooms, avoid running piping above electrical equipment.
- .7 In emergency generator room or other similar spaces, avoid running piping near outdoor air intake louvers.
- .8 Make provision so that all parts of system can be properly drained.
- .9 Supply and install drain piping as required. Pipe drain discharge line to floor drains or service sinks. Do not discharge to the building exterior.
- .10 Provide sprinkler head protective guards in mechanical rooms, loading dock, storage rooms and where sprinkler heads are subjective to mechanical or physical damage.
- .11 Mount spare sprinkler head cabinet on wall adjacent to the sprinkler tree.
- .12 Locate fire department connection with sufficient clearance from walls, obstructions or adjacent Siamese connectors to allow full swing of fire department wrench handle. Fire department connection shall be within 45 m of a fire hydrant.
- .13 Testing to be witnessed by authority having jurisdiction.
- .14 Install piping to allow for expansion and contraction without unduly stressing pipe or connected equipment.

4.3 Hanging, Bracing and Restraint of System Piping

- .1 Install pipe hangers and supports in accordance with NFPA 13.
- .2 Do not hang other piping, wiring or equipment from sprinkler pipe, hangers or supports.
- .3 Do not bend threaded rod for pipe hangers or supports.
- .4 Install upper attachment from the top cord of structural joists.
- .5 Provide additional structural supports as required to support piping.

4.4 Identification

- .1 Identify equipment and components in accordance with The City of Winnipeg Water and Waste Department Identification Standard, document code 510276-0000-40ER-0002.
- .2 Identify piping in accordance with ANSI/NFPA 13 and ANSI/NFPA 14.

4.5 Electrical Connections

- .1 Provide electrical work under Section D5010.
- .2 Provide fire alarm system under Section D5030.
- .3 Provide control and fire alarm wiring, including connections to fire alarm systems, in accordance with Canadian Electrical Code.
- .4 All flow, pressure and tamper switches and devices are compatible with the building fire alarm systems.

4.6 Painting, Repairs and Restoration

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

4.7 Field Painting

- .1 Clean, pretreat, prime, and paint new systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories.
- .2 Apply coatings to clean, dry surfaces, using clean brushes.
- .3 Clean surfaces to remove dust, dirt, rust, and loose mill scale.
- .4 Immediately after cleaning, provide metal surfaces with 1 coat of pretreatment primer applied to minimum dry film thickness of 0.3 mil, and one coat of zinc chromate primer applied to minimum dry film thickness of 1.0 mil.
- .5 Shield sprinkler heads with protective covering while painting is in progress.
- .6 Upon completion of painting, remove protective covering from sprinkler heads.
- .7 Remove sprinkler heads which have been painted and replace with new sprinkler heads.
- .8 Provide primed surfaces with following:
 - .1 Piping in Finished Areas:
 - .1 Provide primed surfaces with 2 coats of paint to match adjacent surfaces.
 - .2 Provide valves and operating accessories with 1 coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil.
 - .3 Provide piping with 50 mm wide red enamel bands or self-adhering red plastic bands spaced at maximum of 6 m intervals throughout piping systems.
 - .2 Piping in Unfinished Areas:
 - .1 Provide primed surfaces with one coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil in attic spaces, spaces above suspended ceilings, crawl spaces, pipe chases, mechanical equipment room, and spaces where walls or ceiling are not painted or not constructed of a prefinished material.
 - .2 Provide piping with 50 mm wide red enamel bands or self-adhering red plastic bands spaced at maximum of 6 m intervals.

4.8 Flushing and Cleaning

- .1 Flush and clean the interior and exterior of all systems including strainers.

4.9 Field Quality Control

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.
 - .1 Submit tests as specified in other sections of this specification.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

4.10 Demonstration

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .2 Use operation and maintenance manual and as-built drawings as part of instruction materials.

4.11 Protection

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

4.12 Clean Up

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

- .1 The work includes the provision of all design, labour, materials, equipment, permitting and services required to install sanitary waste systems for a complete project within and to 1500 mm beyond building perimeters.

1.2 REFERENCE

- .1 Government of Manitoba
 - .1 Manitoba Regulation 31/2011, Manitoba Building Code
 - .2 Manitoba Regulation 32/2011, Manitoba Plumbing Code

1.3 RELATED WORK

- .1 Section 21 00 00 – Fire Protection Sprinkler Systems

1.4 DEFINITIONS

- .1 AHJ –Authority Having Jurisdiction
- .2 FM –Factory Mutual
- .3 ULC – Underwriters’ Laboratory of Canada

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Design and Construction Documents
 - .1 Develop plans, schedules, isometric or flat riser diagrams and details indicating all information required to clearly illustrate the intent of system design. All piping shall be located and sized on the Contract Drawings.
 - .2 Floor plans and riser diagrams shall include, but not be limited to identification of all sanitary waste piping from fixtures to connection to exterior sewer, all vent piping from fixtures and stacks to termination through roof, cleanouts, fixture and equipment identification, traps and trap primer lines.
 - .3 Calculated fixture units used for system design shall be noted at sanitary sewers exiting the building, base of stacks, floor branch connections at stacks, ejector pump system discharge and interceptor inlets.
 - .4 Details shall be provided for floor drains, cleanouts, roof penetrations, floor and wall penetrations and all other components that require installation explanation beyond the information included within plans and riser diagrams.
 - .5 Prepare drawings in accordance with the City of Winnipeg Drafting Standards Manual in Appendix A and National Building Code requirements.
 - .6 Submitted plans, sections and schematics to be drawn to an indicated scale and include the following information at a minimum:
 - .1 Name and address of building,
 - .2 North arrow,
 - .3 Type and locations of hangers, sleeves, braces and methods of securing piping when applicable,

- .4 A graphic representation of the scale used on all plans,
 - .5 Name and address of Contractor,
 - .6 Signed and dated seal of the design engineer licenced to practice in the province of Manitoba,
 - .7 Show details and listing numbers of fire stop systems used at all penetrations, and
- .3 Shop drawings:
- .1 Shop drawings: submit drawings stamped and signed by designer registered and acceptable to the authority having jurisdiction.
 - .2 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
 - .3 Submit shop drawings for the following:
 - .1 Floor drains
 - .2 Cleanouts
- .4 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Closeout Submittals:
- .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Contract Administrator before final inspection.
 - .3 Site records:
 - .1 Transfer information weekly to reproducible, revising reproducible to show work as actually installed.
 - .2 Use different colour for each service.
 - .3 Make available for reference purposes and inspection.
 - .4 As-built drawings:
 - .1 Prior to testing of the fire suppression system, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW FIRE SUPPRESSION SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Contract Administrator for review and make corrections as directed.
 - .5 Record drawings
 - .1 Finalize the record drawings upon the review of the as-built drawings.
 - .2 Submit completed reproducible record drawings with Operating and Maintenance Manuals.

Part 2 Design

2.1 FUNCTIONAL CRITERIA

- .1 Sanitary waste and vent systems shall be provided for all new sprinkler installations at test headers and other locations as required.

- .2 Waste and vent systems shall be designed using fixture drain loads established by code and provide proper operation during periods of peak demand.
- .3 Main waste and vent stacks shall utilize chases or be located adjacent to columns where possible for vertical routing to multiple floor levels.
- .4 Provide cleanouts at locations and with clearances as required by the code, at the base of each waste stack and at intervals indicated in the Manitoba Plumbing Code for horizontal runs. All interior cleanouts shall be accessible from walls or floors. Provide wall cleanouts in lieu of floor cleanouts wherever possible. A floor cleanout shall be installed only where installation of a wall cleanout is not practical. Coordinate the location of all cleanouts with the architectural features of the building and obtain approval of locations from the Contract Administrator.
- .5 No buried waste line shall be smaller than 75 mm. No vent line shall be smaller than 40 mm. No roof vent terminal shall be smaller than 75 mm.
- .6 Locate all sanitary vent terminals a minimum of 3.5 metres horizontally from or 1 metre vertically above all air intakes, operable windows, doors and any other building openings.
- .7 All drain traps shall be properly vented in accordance with the Manitoba Plumbing Code.
- .8 Provide water supplied trap primers for all floor drains, floor sinks and hub drains, that may be susceptible to trap seal evaporation.

Part 3 Products

3.1 MATERIAL

- .1 All materials used on this project shall be new and CSA approved unless noted otherwise

3.2 PIPE AND FITTINGS

- .1 Cast Iron Soil Pipe
 - .1 Pipe: cast iron soil pipe to CAN/CSA-B70-M91.
 - .2 Mechanical Joint Components: hubless fittings, elastomeric gaskets and stainless steel mechanical joint couplings to CAN/CSA-B70-M91.
- .2 PVC Pipe
 - .1 Pipe: PVC plastic pipe to CAN/CSA-B 181.2-M90.
 - .2 Fittings: PVC fittings to CAN/CSA-B 181.2-M90.
 - .3 Solvent Cement: PVC Solvent Cement to ASTM D 2564-93.

3.3 CLEANOUTS

- .1 Provide caulked or threaded type extended to finished floor or wall surface. Ensure ample clearance at clean-out for rodding of sanitary drainage system.
- .2 Floor clean out access covers in unfinished areas shall be round with nickel bronze frames and plates. Provide access covers in finished areas with depressed centre section to accommodate floor finish. Wall clean-outs to have chrome-plated caps.

3.4 FLOOR DRAINS

- .1 Lacquered cast iron body with double drainage flange, weep holes, combined two-piece body, reversible clamping device and adjustable nickel/bronze strainer complete with a polished bronze funnel type strainer.

Part 4 Execution

4.1 INSTALLATION

- .1 Lubricate clean-out plugs with linseed oil. Prior to Total Performance remove clean-out plugs, re-lubricate and reinstall using only enough force to ensure permanent leak-proof joint.
- .2 Where floor drains are located over occupied areas, provide waterproof installation.
- .3 Routes and Grades:
 - .1 Route piping in an orderly manner and maintain proper grades.
 - .2 Install piping to conserve headroom and space.
 - .3 Route above grade piping parallel to walls.
 - .4 Where practicable, group piping at common elevations.
 - .5 Install concealed pipes close to building structure to keep furring to a minimum.
 - .6 Grade horizontal vent piping at 2% minimum.

4.2 CLEAN UP

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General**1.1 SUMMARY**

- .1 Section includes:
 - .1 General requirements that are common to National Master Specification sections found in Section 26 – Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C22.1, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations; and,
 - .2 CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC):
 - .1 EEMAC 2Y-1, Light Gray Colour for Indoor Switch Gear.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).
- .4 City of Winnipeg Water and Waste Department – Electrical Design Guide, Rev 01.
- .5 City of Winnipeg Water and Waste Department – Automation Design Guide, Rev 00.
- .6 City of Winnipeg Water and Waste Department – Identification Standard, Rev 00.

1.3 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: Provide identification nameplates for control items in English.

1.4 SUBMITTALS

- .1 Quality Control:
 - .1 Provide CSA certified equipment and material;
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to Site;
 - .3 Submit test results of installed electrical systems and instrumentation;
 - .4 Permits and fees in accordance with General Conditions of Contract; and,
 - .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Contract Administrator.

- .2 Manufacturer's Field Reports: Submit to Contract Administrator manufacturer's written report, within three (3) days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in Part 3.5 – Field Quality Control.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance:
 - .1 Qualifications:
 - .1 Electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks; and,
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

1.6 SYSTEM STARTUP

- .1 Instruct City's personnel in operation, care and maintenance of systems, system equipment and components.
- .2 Assist City's personnel and the Contract Administrator in the start-up of equipment.
- .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant will aspects of its care and operation.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to Site and submit such approval as described in Part 1 – Submittals.
- .2 Factory assemble control panels and component assemblies.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls.
- .2 Control wiring and conduit: in accordance with Division 26 and Division 28.

2.3 WARNING SIGNS

- .1 Warning Signs: In accordance with requirements of inspection authorities.
- .2 Lamacoid signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates as follows:
- .1 Nameplates: Lamacoid 3 mm thick plastic engraving sheet, white with black core, lettering accurately aligned and engraved into core mechanically attached with self-tapping stainless steel screws.
- .2 Lamacoids as follows:

Application	Text Size	Text
Electrical Equipment – General	5 mm	Line 1: Identifier
Circuit Breaker – Separate	5 mm	Line 1: Identifier Line 2: Load Identifier Line 3: Load Description
Disconnect Switch – Separate	5 mm	Line 1: Identifier Line 2: Load Identifier Line 3: Load Description
Fire Alarm Devices	8 mm	Line 1: Identifier
Light Switches	3 mm	Source Panel and Circuit Number
Panelboards	8mm	Line 1: Identifier Line 2: Description Line 3: System Voltage Line 4: Fed By
Circuit Breaker	3 mm	Description
Receptacles	3 mm	Source Panel and Circuit Number
Transformer – Indoor	8 mm	Line 1: Identifier Line 2: Rating, System Voltage Line 3: Fed By

- .2 Wording on nameplates to be approved Contract Administrator prior to manufacture.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes, and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.
- .4 Colour Codes:

	Prime	Auxiliary
Power, 120/208/240 VAC	Black	
UPS Power, 120/208/240 VAC	Black	Green
Control Wiring, 120VAC	Black	Orange
Fire Alarm	Red	
Low Voltage Communication/General	Blue	
Low Voltage Control Wiring, <50 V up to 250 V	Blue Yellow	Orange
Other Communication Systems	Green	Blue

.5 Cable Colour Codes:

	Prime	Auxiliary
Power, 120/208/240 VAC	Black	
UPS Power, 120/208/240 VAC	Black	Green
Control Wiring, 120VAC	Black	Orange
Fire Alarm	Red	
Low Voltage Communication/General	Blue	
Low Voltage Control Wiring, <50 V	Blue	Orange
Intrinsically Safe up to 600 V	Blue Yellow	White Green
Other Communication Systems	Green	Blue

2.8 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.

.1 Paint indoor switchgear and distribution enclosures light gray to EEMAC 2Y-1.

Part 3 Execution

3.1 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify by Contract Administrator before proceeding with installation.

.3 Install electrical equipment at following heights unless indicated otherwise.

.1 Local Switches: 1400 mm.

.2 Wall Receptacles:

.1 General: 300 mm.

- .2 In mechanical rooms: 1400 mm.
- .3 Panelboards: As required by Code or as indicated on the Drawings.
- .4 Control Panels: As indicated on the Drawings.

3.4 FIELD QUALITY CONTROL

- .1 Conduct following tests:
 - .1 Circuits originating from branch distribution panels.
 - .2 Insulation resistance testing:
 - .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument;
 - .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument; and,
 - .3 Check resistance to ground before energizing.
- .2 Carry out tests in presence of Contract Administrator.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of Project.

3.5 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for wire and box connectors.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA-C22.2No.18, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware; and,
 - .2 CSA C22.2No.65, Wire Connectors.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC):
 - .1 EEMAC 1Y-2, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA).

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CSA C22.2No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors: to EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for stranded copper conductors;
 - .2 Clamp for stranded copper conductors;
 - .3 Stud clamp bolts;
 - .4 Bolts for copper conductors; and,
 - .5 Sized for conductors, as indicated.
- .4 Clamps or connectors for armoured cable, flexible conduit, non-metallic sheathed cable as required to: CAN/CSA-C22.2 No.18.

Part 3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.
 - .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 26 05 20 - Wire and Box Connectors – 0-1000 V.

1.2 REFERENCES

- .1 CSA C22.2 No.0.3, Test Methods for Electrical Wires and Cables.
- .2 CSA C22.2 No. 208, Fire Alarm and Signal Cable.

Part 2 Products**2.1 BUILDING WIRES**

- .1 Conductors: Stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper conductors: Size as indicated on the Drawings, with thermoplastic insulation type TWU or TWH rated at 300 V.

2.2 CONTROL CABLES

- .1 Type LVT: Soft annealed copper conductors, with thermoplastic insulation, outer covering of thermoplastic jacket.
- .2 300 V type: Stranded annealed copper conductors, sizes as indicated with PVC insulation type TW, or cross-linked polyethylene type RW90 (x-link with shielding of metallized tapes over each pair of conductors and overall covering of thermoplastic jacket interlocked armour and jacket over sheath of PVC.

2.3 FIRE ALARM AND SIGNAL CABLES

- .1 Type FAS:
 - .1 105° C outer jacket;
 - .2 Red FT4 rated jacket;
 - .3 300 V insulation; and
 - .4 Shielded.
- .2 Type armoured FAS:
 - .1 105° C outer jacket;
 - .2 Red FT4 rated jacket;
 - .3 300 V insulation;
 - .4 Shielded; and,
 - .5 Aluminum interlocked armour.

Part 3 Execution

3.1 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastening and Conduit Fitting.

3.2 INSTALLATION OF CONTROL CABLES

- .1 Install control cables in conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastening and Conduit Fitting.
- .2 Ground control cable shield.

3.3 INSTALLATION OF FIRE ALARM AND SIGNAL CABLES

- .1 Install FAS control cables in conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastening and Conduit Fitting, in exposed areas.
- .2 Install armoured FAS cable in concealed spaces including office area ceiling and office area walls.
- .3 Ground control cable shield.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 26 05 00 - Common Work Results – Electrical.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE):
 - .1 ANSI/IEEE 837, Qualifying Permanent Connections Used in Substation Grounding.
 - .2 Canadian Standards Association, (CSA International).
 - .3 CSA C22.1, Canadian Electrical Code, Part 1.

Part 2 Products**2.1 EQUIPMENT**

- .1 Clamps for grounding of conductor: Size as required to electrically conductive.
- .2 Grounding conductors: Bare stranded copper, soft annealed.
- .3 Insulated grounding conductors: Green, type RW90.
- .4 Non-corroding accessories necessary for grounding system, type, size, including but not necessarily limited to:
 - .1 Grounding and bonding bushings;
 - .2 Protective type clamps;
 - .3 Bolted type conductor connectors;
 - .4 Bonding jumpers, straps; and,
 - .5 Pressure wire connectors.

Part 3 Execution**3.1 INSTALLATION GENERAL**

- .1 Install complete permanent, continuous grounding system to new equipment.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .5 Soldered joints not permitted.

- .6 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

3.2 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in control panels, fire alarm devices.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Not Used

Part 2 Products**2.1 SUPPORT CHANNELS**

- .1 U shape aluminum, size 41 x 41 mm, 2.5 mm thick, surface mounted or suspended.

Part 3 Execution**3.1 INSTALLATION**

- .1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .5 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One (1) hole stainless steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two (2) hole stainless steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel Work.
- .6 Suspended support systems:
 - .1 Support individual cable or conduit runs with 6 mm dia. threaded rods and spring clips; and,
 - .2 Support two (2) or more cables or conduits on channels supported by 6 mm dia. threaded rod hangers where direct fastening to building construction is impractical.
- .7 For surface mounting of two (2) or more conduits use channels at 1 m on center spacing.
- .8 Provide metal brackets, frames, hangers, clamps, and related types of support structures where indicated or as required to support conduit and cable runs.
- .9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .10 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .11 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Contract Administrator.

- .12 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.
- .13 Cutting and coring of existing masonry walls to be completed in conjunction with Asbestos Abatement Contractor.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 CSA C22.1, Canadian Electrical Code, Part 1.

Part 2 Products**2.1 OUTLET AND CONDUIT BOXES GENERAL**

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with barriers where outlets for more than one (1) system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

- .1 One (1) piece electro-galvanized construction.
- .2 Single and multi-gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm. 102 mm square outlet boxes when more than one (1) conduit enters one (1) side with extension and plaster rings as required.
- .3 Extension and plaster rings for flush mounting devices in finished plaster walls.

2.3 CONDUIT BOXES

- .1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.4 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

Part 3 Execution**3.1 INSTALLATION**

- .1 Support boxes independently of connecting conduits.

- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of Work.
- .3 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Reducing washers are not allowed.
- .4 Install cast conduit boxes for surface mounted devices.
- .5 Install galvanized steel outlet boxes for recess mounted devices.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Canadian Standards Association (CSA):
 - .1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware;
 - .2 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit; and,
 - .3 CSA C22.2 No. 83, Electrical Metallic Tubing.

Part 2 Products**2.1 CONDUITS**

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .2 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

2.2 CONDUIT FASTENINGS

- .1 One(1) hole aluminum or stainless steel straps to secure surface conduits 50 mm and smaller. Two (2) hole aluminum or stainless steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel Work.
- .3 Channel type supports for two (2) or more conduits at 1 m on centre.
- .4 Stainless steel threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Fittings: Manufactured for use with conduit specified.
- .2 Coating: Same as conduit.
- .3 Factory "ells" where 90° bends are required for 25 mm and larger conduits.
- .4 Watertight connectors and couplings for EMT. Set-screws are not acceptable.

2.4 FISH CORD

- .1 Polypropylene.

Part 3 Execution**3.1 INSTALLATION**

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

-
- .2 Existing structure may contain asbestos. Confirm materials are free of asbestos before drilling or coring. Coordinate coring and cutting of structures containing asbestos with Asbestos Abatement Contractor.
 - .3 Use EMT conduit inside building areas.
 - .4 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment.
 - .5 Minimum conduit size: 19 mm.
 - .6 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
 - .7 Mechanically bend steel conduit over 19 mm dia.
 - .8 Install fish cord in empty conduits.
 - .9 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
 - .10 Dry conduits out before installing wire.

3.2 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended or surface channels.
- .5 Do not pass conduits through structural members.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.3 FIRE STOP

- .1 Fire stop all penetrations through fire separating using an approved fire stop assembly.

END OF SECTION

Part 1 General**1.1 Scope**

- .1 The scope of work includes:
 - .1 The detailed design, supply, installation, and commissioning of two (2) fully functional addressable fire alarm systems for buildings 552 Plinguet North and 552 Plinguet South.
 - .2 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general alarm, supervising system continuously, actuating zone annunciators, actuating magnetic door locks, and initiating trouble signals.

1.2 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for fire alarm systems.
 - .2 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general alarm, supervising system continuously, actuating zone annunciators, actuating magnetic door locks, and initiating trouble signals.
 - .3 Trouble signal devices.
 - .4 Power supply facilities.
 - .5 Manual alarm stations.
 - .6 Automatic alarm initiating devices.
 - .7 Audible signal devices.
 - .8 End-of-line devices.
 - .9 Annunciators.
 - .10 Visual alarm signal devices.
 - .11 Ancillary devices.

1.3 REFERENCES

- .1 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525, Audible Signal Device for Fire Alarm Systems.
 - .3 CAN/ULC-S526, Visual Signal Devices for Fire Alarm Systems.
 - .4 CAN/ULC-S527, Control Units.
 - .5 CAN/ULC-S528, Manual Pull Stations for Fire Alarm Systems.
 - .6 CAN/ULC-S529-, Smoke Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S530, Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .8 CAN/ULC-S531, Standard for Smoke Alarms.
 - .9 CAN/ULC-S536-S537, Burglar and Fire Alarm Systems and Components.
- .2 National Fire Protection Agency
 - .1 NFPA 72, National Fire Alarm Code.
 - .2 NFPA 90A, Installation of Air Conditioning and Ventilating Systems.

1.4 SUBMITTALS

- .1 Permit:
 - .1 Submit complete design drawings, specifications, and applications required to obtain building and electrical permits.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Shop drawings: stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.
 - .2 Include:
 - .1 Building floor plans;
 - .2 Updated breaker panel schedules;
 - .3 Layout of equipment;
 - .4 Equipment mounting heights;
 - .5 Zoning;
 - .6 Equipment data sheets;
 - .7 Riser diagrams;
 - .8 Power supply calculations;
 - .9 Voltage drop calculations; and
 - .10 Complete wiring diagrams, including schematics of modules.
- .4 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .3 Manufacturer's Field Reports: manufacturer's field reports specified.
- .5 Closeout Submittals:
 - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 – Closeout Submittals in accordance with ANSI/NFPA 20.
 - .2 Submit following:
 - .1 Manufacturer's Data for:
 - .1 Control panel and modules.
 - .2 Storage batteries.
 - .3 Battery charger.
 - .4 Manual pull stations.
 - .5 Heat detectors.
 - .6 Open-area smoke detectors.
 - .7 Alarm bells.

- .8 Alarm horns.
- .9 Visible appliances.
- .10 Main annunciator.
- .11 Graphic annunciator panel.
- .12 Master fire alarm boxes.
- .13 Auxiliary transmitter.
- .14 Master box.
- .15 Combination auxiliary transmitter and interface panel.
- .16 Wiring.
- .17 Trouble buzzer.
- .18 Surge suppression devices.
- .19 Mark data which describe more than one type of item to indicate which type will be provided.
- .2 System wiring diagrams:
 - .1 Submit complete wiring diagrams of system showing points of connection and terminals used for electrical connections in the system.
 - .2 Show modules, relays, switches and lamps in control panel.
- .3 Design data: Power Calculations:
 - .1 Submit design calculations to substantiate that battery capacity exceeds supervisory and alarm power requirements.
 - .2 Show comparison of detector power requirements per zone versus control panel smoke detector power output per zone in both standby and alarm modes.
 - .3 Show comparison of notification appliance circuit alarm power requirements with rated circuit power output.
- .4 Instructions for operation:
- .5 Schedules:
 - .1 Conductor wire marker schedule.
- .6 Test Reports:
 - .1 Verification report
 - .2 Open-area 2-wire smoke detectors.
 - .3 Preliminary testing:
 - .1 Final acceptance testing.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Engineer: company or person specializing in fire alarm system designs with 5 years of experience.
 - .2 Installer: company or person specializing in fire alarm system installations with 5 years of experience and approved by manufacturer.
 - .3 Installer shall have a valid CFAA Fire Alarm Technician registration.
- .2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

Part 2 Products**2.1 MATERIALS**

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Power supply: to CAN/ULC-S524.
- .3 Signal Isolators: to CAN/ULC-S524.
- .4 Audible signal devices: to CAN/ULC-S525.
- .5 Visual signal devices: to CAN/ULC-S526.
- .6 Control unit: to CAN/ULC-S527.
- .7 Manual pull stations: to CAN/ULC-S528.
- .8 Thermal detectors: to CAN/ULC-S530.
- .9 Smoke detectors: to CAN/ULC-S529.
- .10 Smoke alarms: to CAN/ULC-S531.

2.2 SYSTEM OPERATION

- .1 Provide complete, electrically supervised, annunciated, fire alarm systems.
- .2 Provide separate circuits from control panels to each zone of initiating devices. Transmission of signals from more than one zone over common circuit to control panel is prohibited.
- .3 Trouble signal on the following:
 - .1 Sprinkler system valve tamper switch.
 - .2 Sprinkler system supply pressure switch.
- .4 Single stage operation. Operation to actuation following:
 - .1 Manual station.
 - .2 Heat detector.
 - .3 Smoke detector.
 - .4 Wet pipe sprinkler system flow detector.
 - .5 Dry pipe sprinkler system zone pressure switch.
- .5 Actuation of single operation device to initiate following:
 - .1 Building evacuation alarm devices to operate continuously.

- .2 Transmit signal to alarm company via phone line and cellular modem.
- .3 Alarm device to be indicated on control panel.
- .4 Release all magnetically held doors.
- .5 Operations to remain in alarm mode (except alarm notification appliances if manually silenced) until system is manually restored to normal.
- .6 Capability to program smoke detector status change confirmation on any or zones in accordance with CAN/ULC-S527, Appendix C.

2.3 CONTROL PANEL

- .1 Class A.
- .2 Single stage operation.
- .3 Enclosure:
 - .1 CSA Enclosure 1, c/w lockable concealed hinged door, full viewing window, flush lock and 2 keys.
 - .2 Provide modular type panel installed in surface mounted steel cabinet with hinged door and cylinder lock.
 - .3 Mount with panel centerline 1.5 m above finished floor elevation.
 - .4 Switches and other controls: not accessible without use of key.
 - .5 Design of control panel: neat, compact assembly containing parts and equipment required to provide specified operating and supervisory functions of system.
 - .6 Control panel components: CSA approved and approved by control panel manufacturer for use in control panel.
 - .7 Panel cabinet: finished on inside and outside with factory-applied enamel finish.
 - .8 Provide main annunciator located on exterior of cabinet door or visible through cabinet door.
 - .9 Provide audible trouble signal.
 - .10 Provide permanent engraved identification plates, attached to rear face of panel viewing window, for lamps and switches.
 - .11 Permanently label switches.
 - .12 Provide panel with following switches:
 - .1 Trouble silencing switch which silences audible trouble signals including remote trouble devices without extinguishing trouble indicating lamp(s).
 - .1 For non-self-resetting type switch: Upon correction of trouble condition, audible signals will again sound until switch is returned to its normal position.
 - .2 For silencing switch of momentary action self-resetting type: trouble signal circuit automatically restored to normal upon correction of trouble condition.
 - .2 Evacuation alarm silencing switch which when activated will silence alarm notification appliances without resetting panel, and cause operation of system trouble signals. Subsequent alarm(s) from additional zone(s) not originally in alarm to cause activation of notification appliances even with alarm silencing switch in "silenced" position.
 - .3 Individual zone disconnect switches which when operated will disable only their respective initiating circuit and cause operation of system and zone trouble signals.

- .4 Reset switch which when activated will restore the system to normal standby status after cause of alarm has been corrected, and activated initiating devices reset.
 - .1 Operation of reset switch to restore activated smoke detectors to normal standby status.
- .5 Lamp test switch.
- .4 Supervised, modular design with plug-in modules:
 - .1 Alarm receiver with trouble and alarm indications provision for remote supervised annunciation, for class A initiating circuit.
 - .2 Spare zones: compatible with smoke detectors and open circuit devices.
 - .3 Minimum 25% additional space for future modules.
 - .4 Latching type supervisory receiver circuits. Discrete indication for both off-normal and trouble.
- .5 Components:
 - .1 Alarm receiver panel with trouble and alarm indications for class A initiating circuit.
 - .2 Single stage alarm pulse rate panels:
 - .1 Single stroke control type for output to signal control panel continuously.
 - .3 Common control and power units:
 - .1 Control panel containing following indications and controls:
 - .1 "Power on" LED (green) to monitor primary source of power to system.
 - .2 "Power trouble" indication.
 - .3 "Ground trouble" indication.
 - .4 "Remote annunciator trouble" indication.
 - .5 "System trouble" indication.
 - .6 "System trouble" buzzer and silence switch c/w trouble resound feature.
 - .7 System reset switch.
 - .8 "LED test" switch if applicable.
 - .9 "Alarm silence" switch to silence signals manually. If new alarm occurs after signals have been silenced, signals to resound.
 - .10 "Signals silenced" indication.
 - .2 Master power supply panel to provide 24 V dc to system from 120 V ac, 60 Hz input.
 - .4 Auxiliary relays: plug-in type, dust cover, supervised against unauthorized removal by common trouble circuit.
 - .1 Contacts: 2.0 A, 120 V ac, for functions such as release of door holders or initiation of fan shut down.
 - .2 Contact terminal size: capable of accepting 22-12 AWG wire.

2.4 POWER SUPPLY

- .1 120 V, ac, 60 Hz input, 24 V dc output from rectifier to operate alarm and signal circuits, with standby power of gell cell batteries minimum expected life of 4 years, sized in accordance with NBC.

2.5 MANUAL ALARM STATIONS

- .1 Provide addressable single action type with mechanical reset features.
 - .1 Non-coded single pole normally open contact for single stage.
 - .2 General alarm key switch for two stage system.
- .2 Surface mounted stations for masonry walls.
- .3 Flush mounted stations for drywall walls.
- .4 For surface mounting provide station manufacturer's approved back box. Back box finish to match station finish.
- .5 Equip each station with terminal strip with contacts of proper number and type to perform functions required.
- .6 Stations: type not subject to operation by jarring or vibration.
 - .1 Break-glass-front stations are not permitted;
- .7 Station colour: red.
- .8 Provide station with visible indication of operation.
- .9 Restoration to require use of key.
 - .1 Keys: identical throughout system for stations and control panel(s).
- .10 Mount stations with operating lever not more than 1.2 m above finished floor.

2.6 AUTOMATIC ALARM INITIATING DEVICES

- .1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature and rate-of-rise principle.
- .2 Combination Fixed Temperature Rate-Of-Rise Detectors (Spot Type): designed for surface outlet box mounting and supported independently of conduit, tubing or wiring connections.
 - .1 Contacts: self-resetting after response to rate-of-rise actuation
 - .2 Operation under fixed temperature actuation to result in external indication.
 - .3 Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes to operate on fixed temperature principle only.
- .3 Open-Area Smoke Detectors: provide detectors designed for detection of abnormal smoke densities by ionization or photoelectric principle.
 - .1 Detectors: 4-wire type.
 - .2 Provide necessary control and power modules required for operation integral with control panel.
 - .3 Detectors and associated modules: compatible with control panel and suitable for use in supervised circuit.
 - .4 Malfunction of electrical circuits to detector or its control or power units to result in operation of system trouble signals.
 - .5 Equip each detector with visible indicator lamp that will flash when detector is in normal standby mode and glow continuously when detector is activated.

- .6 Each detector: plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which detector base contains screw terminals for making wiring connections.
- .7 Detector head: removable from its base without disconnecting wires. Removal of detector head from its base to cause activation of system trouble signals.
- .8 Screen each detector to prevent entrance of insects into detection chamber(s).
- .4 4-Wire Smoke Detectors: detector circuits 4-wire type capable of transmitting detector operating power over conductors separate from initiating circuit.
 - .1 Provide separate, power circuit for each smoke detection initiating circuit (zone).
 - .2 Failure of power circuit to be indicated as trouble condition on corresponding initiating circuit.
- .5 Ionization Detectors: multiple chamber type responsive to both invisible and visible particles of combustion.
 - .1 Detectors: not susceptible to operation by changes in relative humidity.
- .6 Photoelectric Detectors: operate on light scattering principle using LED light source.
 - .1 Detector: respond to both flaming and smoldering fires.
- .7 Locate detectors in accordance with their listing by ULC and the requirements of NFPA 72.
- .8 Mount detectors at underside of ceiling or deck above unless otherwise indicated.
- .9 Temperature rating of detectors: in accordance with NFPA 72.
- .10 Locate detectors minimum 300 mm to lighting fixtures, not closer than 600 mm to air supply or return diffuser and not closer than 1000mm to radiant heaters.
- .11 Ensure detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, are approved for such locations.
- .12 Provide detectors with terminal screw type connections.
- .13 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

2.7 ALARM INITIATING DEVICE SPACING AND LOCATION

- .1 Detector spacing and location: in accordance with manufacturer's recommendations and requirements of NFPA 72.

2.8 AUDIBLE SIGNAL DEVICES

- .1 Audible device(s):
 - .1 Horns: 24 V dc, sound output as required by National Building Code of Canada and Manitoba Building Code for appliance spacing and location.
- .2 Surface mounted devices for masonry walls.
- .3 Flush mounted devices for drywall walls.

- .4 Do not exceed 80 percent of listed rating in amperes of notification appliance circuit. Provide additional circuits above those shown if required to meet this requirement.
- .5 Provide appliances specifically listed for outdoor use in locations exposed to weather.
- .6 Finish appliances in red enamel.
- .7 For surface mounting provide appliance manufacturer's approved back box. Back box finish to match appliance finish.

2.9 END-OF-LINE DEVICES

- .1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel.
- .2 Surface mounted devices for masonry walls.
- .3 Flush mounted devices for drywall walls.

2.10 VISUAL ALARM SIGNAL DEVICES

- .1 Surface mounted devices for masonry walls.
- .2 Flush mounted devices for drywall walls.
- .3 SPEC NOTE: Ensure that visual alarm signal devices are connected with audible signalling devices in high noise level areas.
- .4 Assembly of stroboscopic type suitable for use in electrically supervised circuit and powered from notification appliance circuit[s].
- .5 Appliances: minimum of 15 candela measured as approved by ULC, but not less than effective intensity required by National Building Code of Canada and Manitoba Building Code for appliance spacing and location.
- .6 Protect lamps with thermoplastic lens and labelled "FIRE" in letters at least 12 mm high.
- .7 Provide visible appliances within 300 mm of each audible appliance as indicated.
- .8 Visible appliances may be part of audio-visual assembly, where more than two appliances are located in same room or corridor.

2.11 FREEZE PROTECTION THERMOSTATIC SWITCH

- .1 Provide switch with concealed set point, cover, and allen head screws.
- .2 Omit temperature indicator or conceal indicator within cover. Switch: not to be adjustable below 4 degrees C. Switch contacts to close when fire protection equipment room air temperature drops below 4 degrees C, causing supervisory signal on fire alarm system. Removal of switch from circuit to cause trouble signal on its respective zone.
- .3 Mount switch with centerline 1.5 m above finished floor.

- .4 Provide with insulating subbase when mounting on exterior wall.

2.12 ELECTRO-MAGNETIC DOOR RELEASES

- .1 Provide as indicated shown.
- .2 Mount electro-magnetic release on wall or in wall recess behind door.
- .3 Activation of fire alarm system to release doors on circuit to close. Total projection of door holder-release not to exceed 100 mm.

2.13 VALVE TAMPER SWITCHES

- .1 Provide switches to monitor open position of valves controlling water supply to sprinkler systems.
- .2 Switch contacts to transfer from normal position to off-normal position during first two revolutions of hand wheel or when stem of valve has moved not more than one-fifth of distance from its normal position.
- .3 Provide switch with tamper resistant cover.
- .4 Removal of the cover to cause switch to operate into off-normal position.

2.14 CONDUIT

- .1 Refer to 26 05 34 – Conduits, Conduits Fastening and Conduits Fitting.

2.15 WIRING

- .1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor. Wire for low voltage DC circuits: No. 14 AWG minimum solid copper conductor
- .2 Wire to remote annunciators: No. 18 AWG minimum solid copper conductor.
- .3 Refer to 26 05 21 – Wires and Cables.

2.16 SURGE SUPPRESSION

- .1 Provide line voltage and low voltage surge suppression devices to suppress voltage transients which might damage control panel and components.
- .2 Mount suppressors in separate enclosure(s) adjacent to control panel unless suppressors are specifically UL approved for mounting inside control panel and approved for such use by control panel manufacturer[s].

2.17 LINE VOLTAGE SURGE SUPPRESSOR

- .1 Suppressor: ULC approved with maximum 330 volt clamping level and maximum response time of 5 nanoseconds.
- .2 Suppressor: multi-stage construction which includes inductors and silicon avalanche zener diodes.

- .3 Equip suppressor with light emitting diode which extinguishes upon failure of protection components.
- .4 Fuses: externally accessible.
- .5 Wire in series with incoming power source to protected equipment using screw terminations

2.18 LOW VOLTAGE SURGE SUPPRESSOR

- .1 Suppressor: UL 497B listed with maximum 30 volt clamping level and maximum response time of 5 nanoseconds.
- .2 Suppressor: multi-stage construction and both differential and common mode protection.

2.19 AS-BUILT RISER DIAGRAM

- .1 Fire alarm system riser diagram: on black lamicaid sheet with bevelled edges, white lettering and designations, minimum size 600 x 600 mm.

2.20 CELLULAR MODEM

- .1 Provide cellular modem for fire alarm signal transmission to alarm company.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install systems in accordance with CAN/ULC-S524
- .2 Install main control panel and connect to ac power supply, ac power.
- .3 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .4 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
- .5 Connect alarm circuits to main control panel.
- .6 Locate and install signal, horns and visual signal devices and connect to signalling circuits.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests:
 - .1 Perform tests in accordance with Section 26 05 00S - Common Work Results - for Electrical and CAN/ULC-S537.
 - .2 Fire alarm system:
 - .1 Test each device and alarm circuit to ensure manual stations, thermal and smoke detectors transmit alarm to control panel and actuate general alarm.
 - .2 Check annunciator panels to ensure zones are shown correctly.
 - .3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of system.
 - .4 Class A circuits.
 - .1 Test each conductor on circuits for capability of providing alarm signal on each side of single open-circuit fault condition imposed near midmost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
 - .2 Test each conductor on circuits for capability of providing alarm signal during ground-fault condition imposed near midmost point of circuit. Reset control unit after each alarm function and correct imposed fault after completion of each test.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 TRAINING

- .1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train City personnel in use and maintenance of fire alarm system.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

- .1 The work of this section includes the provision of all design, labour, materials, equipment and services required to fabricate and install water supply and distribution systems as required for a complete project. The work includes, but is not necessarily limited to, the items referenced herein:
 - .1 Site Fire Protection Water Distribution.
 - .2 Provide all piping and connections to the existing municipal water service as required for the project. All water shall be potable.
 - .3 All systems to be in strict compliance with the City of Winnipeg Standard Construction Specifications and NFPA 13.
 - .4 All drawings to be in strict compliance with the City of Winnipeg Water and Waste Department WWD CAD/GIS Standards.

1.2 REFERENCE

- .1 National Fire Protection Association
 - .1 NFPA 13, Standard for the Installation of Sprinkler Systems
- .2 City of Winnipeg
 - .1 Standard Construction Specifications
 - .2 Water and Waste Department WWD CAD/GIS Standards

1.3 RELATED WORK

- .1 Section 21 00 00 – Fire Protection Sprinkler Systems

1.4 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Design and Construction Documents
 - .1 Submit detailed hydraulic calculations and construction drawings for review prior to construction.
 - .2 Prepare fire suppression system drawings in accordance with the City of Winnipeg Drafting Standards Manual in Appendix A, Manitoba Building Code requirements.
 - .3 Submitted Site Plans to be drawn to an indicated scale and include the following information at a minimum:
 - .1 Name and address of facilities,
 - .2 North arrow,
 - .3 Approximate location of exposed and existing buried services,
 - .4 A graphic representation of the scale used on all plans,
 - .5 Legend
 - .6 Name and address of Design-Build Contractor, and
 - .7 Signed and dated seal of the design engineer licenced to practice in the province of Manitoba,
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.

- .1 Site records:
 - .1 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .2 Use different colour for each service.
 - .3 Make available for reference purposes and inspection.
- .2 As-built drawings:
 - .1 Prior to testing of the fire suppression system, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW FIRE SUPPRESSION SYSTEMS AS INSTALLED" (Signature of Design-Build Contractor) (Date).
 - .3 Submit to Contract Administrator for approval and make corrections as directed.
 - .4 Perform testing for fire suppression systems using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

Part 2 Design

2.1 GENERAL

- .1 The Contractor shall engage a qualified Professional Engineer licensed to practice in the Province of Manitoba to design the water supply and distribution systems. Each drawing and specification submission to bear the signature and stamp of the Professional Engineer.
- .2 Design shall be completed in accordance with the City of Winnipeg Standard Construction Specification.
- .3 Hydrants to be provided at locations as per local codes.

Part 3 Products

3.1 MATERIAL

- .1 All material to be in accordance with the City of Winnipeg Standard Construction Specifications.

Part 4 Execution

4.1 SITE FIRE PROTECTION WATER DISTRIBUTION

- .1 All work to be in accordance with the City of Winnipeg Standard Construction Specifications.
- .2 All utility crossings shall be exposed using hydro-excavation, hand excavation, or another approved method to confirm depth. Contractor must acquire appropriate permits to cross, expose, and backfill existing utilities.
- .3 Water required for the installation of services shall be brought into site and waste products from locates and installation of services shall be removed from site.

4.2 SITE RESTORATION

- .1 All work to be in accordance with the City of Winnipeg Standard Construction Specifications.

END OF SECTION