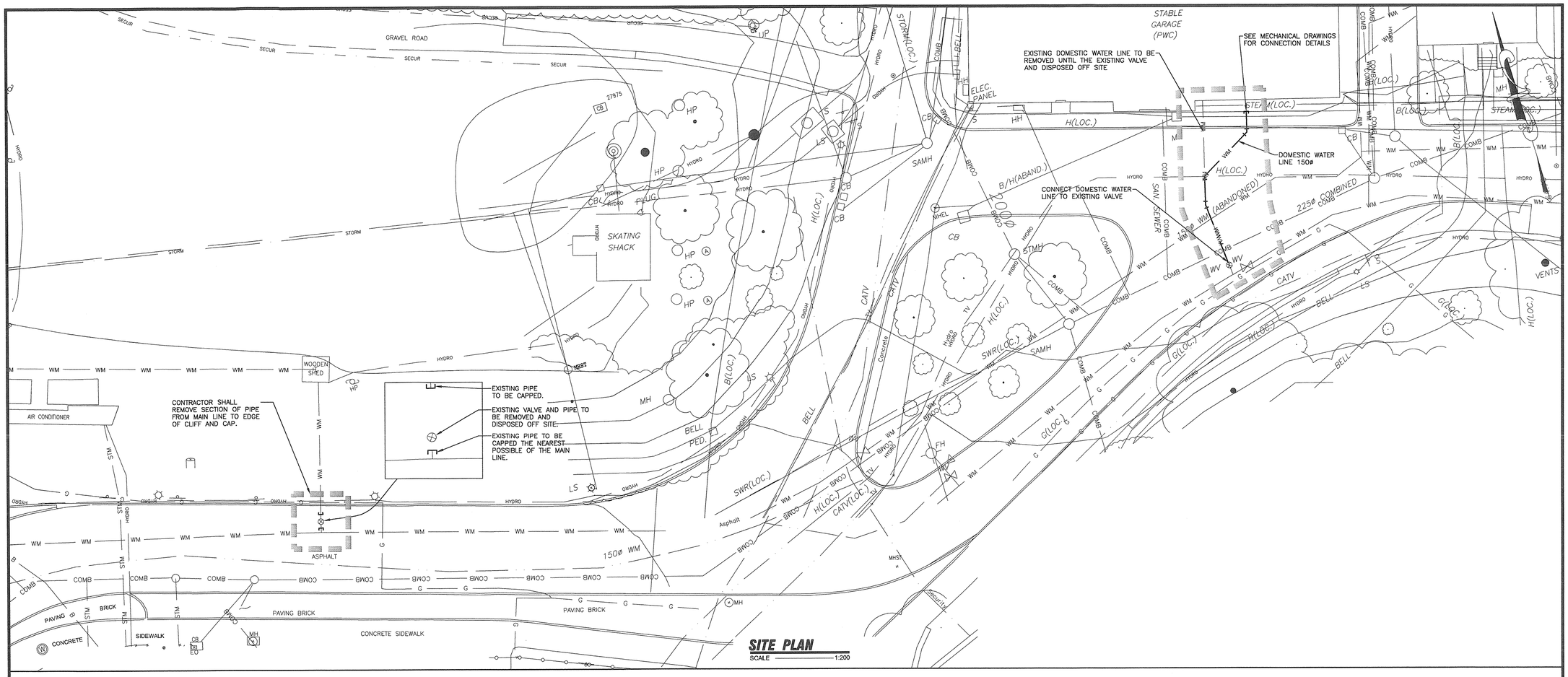

LEGEND

EXISTING		PROPOSED
WM	WATERMAIN	WM
SA	SANITARY SEWER	
STORM	STORM SEWER	
B	TELEPHONE – UNDERGROUND WIRES	
HYDRO	ELECTRICITY – UNDERGROUND WIRES	
	OVERHEAD WIRES	
	LOT LINE	
	CATCHBASIN	
	MANHOLE–CATCHBASIN	
	MANHOLE	
	FIRE HYDRANT	
	VALVE	⊗
	REDUCER	
	TEE	
E	ELECTRICITY POLE	
T	TELEPHONE POLE	
E,T	ELECT.–TEL.–STREET LIGHT POLE	
E,T	ELECT.–TEL.–TRANSFORMER POLE	
TR	ELECTRIC TRANSFORMER	
CB	ELECTRIC CONTROL BOX	
	PRIVATE STREET LIGHT	
E	ELECTRICITY MANHOLE	
T	TELEPHONE MANHOLE	
PK	SURVEY STATION	
130.000	ELEVATION	
FP	FLAG POLE	
IV	IRRIGATION VALVE	
ICV	IRRIGATION CONTROL VALVE	
SIGN	SIGN	
STOP	STOP SIGN	
	TREE	
CB	CATCH BASIN	
MHST	MANHOLE STORM	
HYD	FIRE HYDRANT	
WV	WATER VALVE	
MHEL	MANHOLE ELECTRIC	
	LAMP STANDARD	
HYD. PED.	HYDRO PEDESTAL	
BELL PED.	BELL PEDESTAL	
	TRUNK	
	UTILITY POLE	
HP	HYDRO POLE	
JB	JUNCTION BOX	
SP	SPRINKLER	
	BOULDER	
MHB	MANHOLE BELL	
	BENCH	
	DRINKING FOUNTAIN	
	BIKE RACK	
	LIMIT OF CONSTRUCTION	

1.0 GENERAL

1.1 Unless otherwise indicated, all materials and construction methods must be in accordance with the latest edition of the standardized specifications from OPSS, the City of Ottawa standard specifications and drawings, and all other governing authority requirements as the apply.

1.2 Wherever standards, laws and/or regulations are mentioned, they refer to their current versions, modifications included.

1.3 The location of underground municipal services and public utilities is approximate. Contractor must determine the exact location, size, material and elevation of all existing services and utilities (in the area of work) prior to any excavation work. Damage to any existing services and/or existing utilities during construction, whether or not shown on this drawing, must be repaired by the Contractor at his own expense.

1.4 Compaction shall conform to the following requirements :

MATERIALS	COMPACTION
PIPE BEDDING AND COVER (OPSS GRANULAR 'A')	95% MODIFIED PROCTOR
TRENCH BACKFILL	95% MODIFIED PROCTOR

1.5 The Contractor is responsible for all excavation, backfill as per detail W17 from city of Ottawa standards and reinstatement of all areas disturbed during construction to existing conditions or better, and all associated work, to the satisfaction of the Engineer and the Client.

a) Reinstate road infrastructure with granular material (A or B) to match existing. All existing asphalt must be sawcut. New asphalt shall be regular asphalt HL-8 of the same thickness as existing.

b) Landscaped areas must be reinstated with 100 mm of topsoil and sod.

1.6 Maintain benchmarks and landmark references as is, otherwise these references will be repositioned by a certified land surveyor at the Contractor's expense.

2.0 WATERMAIN

2.1 Domestic water line pipe shall be class 150 PVC DR 18 or approved equivalent and shall conform to AWWA C-900 and CSA-B137.3.

2.2 When possible, all watermain must have a minimum cover of 2.4 m and be installed 2.4 m minimum from any existing or proposed structure that may contribute to frost. Thermal insulation shall be installed where 2.4 m separation cannot be achieved (as per R.O.C WSD-22 and WSD-23)

2.3 All watermain shall be hydrostatically and bacteriologically tested as per municipal and provincial regulations. It is the Contractor's responsibility to ensure that all their requirements are followed. The contractor shall submit the test result to the NCC.

2.4 The contractor shall coordinate closures and openings of the water system with the NCC and ensure compliance with all requirements.

2.5 At every dead-end, tee and direction changes of the water line pipe, the Contractor shall install thrust blocks as per detail OPSD 1103.10

THE UNDERGROUND FEATURES AND INFORMATION THAT APPEAR ON THE DRAWINGS WERE OBTAINED FROM THE PUBLIC UTILITY COMPANIES AND/OR FROM THE CITY EACH RESPECTIVELY.

ALL INFORMATION UNDER THE LEGEND 'EXISTING' IS FOR INFORMATION ONLY. COMPLETE OR EXACT LOCATION AND ELEVATION OF UNDERGROUND SERVICES ARE NOT GUARANTEED.

CERTAIN UNDERGROUND FEATURES ON PRIVATE PROPERTY ARE NOT SHOWN ON THE CURRENT DRAWING.

ANYONE WHO PROCEEDS WITH EXCAVATION WORK SHALL VERIFY THE EXACT LOCATION OF ALL UNDERGROUND FEATURES, BY EXPLORATORY EXCAVATIONS, AND SHALL ASSUME FULL RESPONSIBILITY IF THERE IS ANY DAMAGE THAT OCCURS DURING WORK.

THE CONTRACTOR WILL HAVE THE RESPONSIBILITY AND THE OBLIGATION TO VALIDATE, BY EXPLORATORY EXCAVATION, THE SIZE OF THE PUBLIC UTILITIES UNDERGROUND SERVICES AND TO WARN THE ENGINEER OF ANY CONFLICT WITH THE PROJECTED WORK.

sheet size: ISO_A1

NCC CCN

Canada

Capital Planning and Real Asset Management Branch
Direction de l'aménagement de la capitale et gestion de l'immobilier

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2013/10/02
PROVINCE OF ONTARIO

issued or revised
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no.	description	date
0	ISSUED FOR TENDER	2013/09/23

project
projet

RH INFRASTRUCTURE AND GROUNDS - SITE SERVICES - LIFE CYCLE - STABLE BUILDING

drawing
dessin

CIVIL
MUNICIPAL SERVICES AND AND GENERAL NOTES

approved by / approuvé par	L.SÉGUIN
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drawn by / dessiné par	E. RENÉ DE COTRET
date	MAY 2013
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RH INFRASTRUCTURE AND GROUNDS - SITE SERVICES - LIFE CYCLE - STABLE BUILDING

A. MECHANICAL GENERAL CONDITIONS

.1 DEFINITION
Throughout this document, each of the following words have the corresponding meaning:

a) "Owner": The institution signing the contract with the contractor.

b) "Engineer": The engineer who stamps the plans.

c) The word "contractor" or the name registered, represents the person, the association or the social reason who pledges to provide the materials and executes the work as described in the plans and/or the specifications.

d) "Specifications" means the general or particular requests for each of the subcontractors for the work of:

- Thermal Insulation;
- Plumbing;
- Fire Protection;
- Building automation;
- Fire alarm;
- Electrical

e) "Hidden" elements: Mechanical or electrical elements situated in trenches, floor or wall cavities, shafts or on the top of suspended ceilings. The installations, the apparatus and the elements in a gallery are not considered to be hidden.

f) "Apparent" elements: Not hidden elements.

g) "Provide": supply, install, connect, test and commission.

h) "Acceptable products": Means that only the listed manufacturers are automatically considered as possible suppliers of the product required. Alternate products are to be proved to be equivalent to the specified ones.

i) "Standard of acceptance/required quality": Means that the specified product is the reference for establishing the performances and quality.

j) "Accepted product": Only the specified product must be provided.

k) "Typical": Means that this note or detail is applicable to all similar installations and to all the plans.

.2 GENERALITIES
All the general conditions of these specifications as well as the general clauses of the tender documents are applicable and are an integral part of the present section.

The contractor must provide all materials and supply Labour required to execute perfectly and completely all work described in the Tender Documents.

All supplied and installed material, fixtures and equipment must be new and of first grade.

The contractor must supply a price in compliance with article "TENDER AND SEPARATE PRICES" and must annex to his submission the ventilated prices as well as the requested separate prices.

.3 PLANS & SPECIFICATIONS
The plans give the general organization of the work and the contractors must make the necessary adjustments imposed by the site conditions at no additional cost. Large scale details have precedence on the floor plans. The drawings are not supposed to indicate all structural and/or architectural details.

Do not take dimensions by scale from the drawings, unless they are quoted.

At the time of tendering and/or execution of work, the contractors will notify the Engineer of any deviations or omissions between the plans and specifications. The Engineer will forward written instructions to the tenderers or contractors. The Engineer reserves the exclusive right of interpreting the content in the plans and specification.

The interpretation of the Engineer must be obtained prior to the work execution. If the contractor anticipates incorrectly the engineer's decision, the contractor will be ordered to undo and redo all the work correctly, at the contractors expense.

The plans and specifications complement each other, and the information indicated in one part or another of the documents will not necessarily be repeated in the other one. The contractors must be aware of the local conditions by examining the site.

All addenda will be an integral part of the contract documents.

The Engineer will demand the relocation of any item installed without considering the ease of reading, calibration, access, inspection, maintenance and repair and this will be at the contractor's exclusive expense.

The contractors will be responsible for connecting all anticipated equipment by their contract in their arrangement as received on site.

.4 CODES, STANDARDS AND PERMITS
The labour, materials and installation must comply with all current and applicable federal, provincial and municipal codes and regulations. The contractor must obtain and pay for all permits, certificates, etc relative to the completion of his works.

.5 PROTECTION OF THE PUBLIC AND THIRD PARTY
The contractor must strictly follow all provincial and municipal regulations concerning public and third party health and security.

The contractor must be covered at all times by a public liability insurance policy and other insurance policies relevant to his work[, with a minimal amount of 1 million$.

.6 EQUIVALENCIES
Manufacturers' names of materials, equipment, etc. mentioned in the specifications serve to determine the performance and the quality of the materials required.

The contractor will be responsible for providing material that is in full compliance with all requirements mentioned above, unless he submits a request for equivalency seven (7) days prior to the closing of tenders. The request, made in writing, must describe make, model, dimensions, and performance equivalent to the other matching products. It must be accompanied by shop drawings. All materials approved will be listed in an addendum. All materials not specified in the specifications or in an addendum will be refused. Any substituted apparatus must not exceed the dimensions provided on the plans for its installation, and the contractor must absorb all additional costs that may result.

.7 MANUFACTURERS RECOMMENDATIONS
All apparatus will be installed, connected and started strictly in accordance with the manufacturer recommendations, unless otherwise indicated on the plans and specifications. Each major item of the equipment must carry the manufacturer identification, catalogue and serial numbers. The identification must be placed in a way not to be hidden.

.8 SHOP DRAWINGS
One (1) week after the contract is signed, the contractor must submit shop drawings for approval of all apparatus to be installed, materials list that he proposes to use including the manufacturers names and their catalogue numbers.

The shop drawings must identify the apparatus using the naming of the plans and/or specifications and the room number identified on the plans.

.9 EQUIPMENT AND WORK RESPONSIBILITIES
Protection of work and installations will remain the responsibility of the contractor as long as the tests have not been conducted and the entire work is not received by the Engineer.

All the transportation costs of the equipment and the materials, the fees for unloading and placement, must be included in the contract. After materials delivery, before and after the installation, the contractor must protect the equipment and materials from thief and damage resulting from any cause.

Protect openings, equipments, pipes and conduits to avoid all risks of freezing, rain, snow, wind, dust and/or debris introduction.

All goods damaged by the contractor's negligence to adequately protect the installations will be replaced or repaired at the expense of the contractor(s) at fault.

No equipment or other items belonging to the owner can be used by the contractor.

The contractor is responsible for supplying his own personel, extension cords, tools, ladders, carts, testing equipment, etc.

The contractor will have to do all the work without dirtying, or damaging the equipment, floors, walls, studs, ceilings etc. located in the work areas. All damaged materials by the contractor will be replaced or fixed by the contractor at his own expense.

.10 MATERIALS TO REMOVE AND/OR TO CONSERVE
a) Reuse all existing materials specifically indicated on drawings.
b) All non–reused materials must be offered to the owner. The contractor becomes the owner of all materials that the owner does not keep.
c) Ensure the continuity of all circuits cut by demolition, restoration and repair work.

.11 CLEANING
Upon completion of a working day or earlier when required, the contractor must clean his work area. Upon completion of the project, remove scaffolding, temporary protections and any unused construction materials. Perform the final cleaning and work area cleaning to the satisfaction of the Engineer.

In addition, the general contractor will be responsible to clean, and remove any dust in all the areas of work (including floors, ceilings, walls and all surfaces of equipment) all to the satisfaction of the engineer.

.12 BREAKING, OPENING AND RESURFACING
All the openings in walls or floors up to 205mm (8") inclusively will be the responsibility of the mechanical contractor. Install steel collars with an annular space of 27mm (1"). Coordonate with the general contractor the exact location of the openings.

The general contractor will be responsible for the openings larger than 205mm (8") and all openings thru the roof and foundation wall. Coordinate the location and the size requirement of the openings in the walls and floors with the general contractor. All the required resurfacing will be executed by the general contractor at his own expense.

The openings in floors, walls and roofs will be only made by means of a saw or of a diamond drill. The use of a Jack hammer will not be tolerated.

.13 PAINTING
The general contractor will paint all the apparent fire protection piping red.

The general contractor will paint all the apparent mechanical and electrical equipments the colour specified by the client if required.

The general contractor will be responsible for painting all mechanical piping or their canvas, once all tests have been carried out and prior to identification, in order to adhere to the colours used, or merge with adjacent walls/ceilings. See the colour guide in the **"APPARATUS AND NETWORKS IDENTIFICATION"**

The contractor must apply one coat or more of rust resistant primer on all ferrous metal supports/suspensions as well as on the material fabricated on site. Paint and touch up the already finished surfaces that are damaged and make sure that the new finish is the same as the original one. Repair and refinish badly damaged surfaces.

.14 ANCHORING COMPONENTS
Provide all anchoring components necessary for the suspension supports of piping, conduits, equipment, and so on. The use of anchors and braces installed by nail guns or holes punctured with this method are not allowed.

.15 COORDINATION, COOPERATION AND INTERRUPTION
Even if the specifications are written in sections to properly define the work in certain places, services passing from one place to another must be linked to form complete systems.

The contractor must strictly follow the schedule.

Coordinate the work with all the contractors involved in this project.

Any service shutdown request must be sent 72 hours in advance and pre–approved by the owner.

.16 SUPERVISION
The Engineer will answer the contractor's questions to assist him in performing the work described in the plans and specifications. The contractor will however be the only one responsible of the work execution. The contractor will have to act with diligence to satisfy the remarks written in the site report.

.17 HIDDEN WORK
No work will be hidden before the Engineer has seen it. The contractor must inform the Engineer in writing at least two (2) workdays in advance. If the contractor does not conform, he must pay the incurred expenses for the inspection of the works.

.18 CHANGES AND EXTRA WORKS
The contractor should not execute works or to supply additional materials without having received the written approval from the Engineer and owner. The owner will have the right to make changes during the construction. If an increase or a decrease in cost occurs, an adequate adjustment will be brought to the present contract, as described in the "ADDITIONAL REMUNERATION" section.

The contractor cannot execute work or supply additional materials without receiving a written approval by the engineer or owner. The owner will not pay any supplements to the contractor unless a written agreement was signed beforehand between the owner and the contractor. The additional work or materials, with a written approval, will be calculated in accordance with the "ADDITIONAL REMUNERATION" section.

.19 ADDITIONAL REMUNERATION
The contractor will be able to present a claim for additional (extra) expenses when an addition of an equipment or material took place, as long as this equipment or material was not required for the good operation of the system, by the work conditions or to answer to the real intention of the plans and specifications.

The contractor cannot ask for additional remuneration in case of error, omission or defect from its part. It will be the same if he did not anticipate any difficulties, or if additional work was necessary because of a lack of collaboration with other contractors.

No claims for an increase or a decrease of materials or labour cost can be claimed after the tender has closed.

If it becomes necessary, because of the work execution conditions, to change the location of certain equipments or accessories, the work required to make these modifications will not bring any additional remuneration. However, no credit will be claimed if material or labour economy took place.

The claims for additional remuneration and credit notes will be sufficiently detailed in terms of quantities, materials, prices removed or replaced, and in terms of the labour on site, to satisfy the justification and the accuracy of the estimate.

.20 Commissioning
a) The contractor must include in his mechanical tender, the cost of the services of an authorized manufacturer representative, for certain equipment and/or systems, as listed below:
.1 Fire alarm system
.2 Sprinkler system
.3 BAS system
.4 Backflow preventers

b) The contractor must include commissioning from a manuf. rep. and submit an official report of all the results to the engineer.

.21 MECHANICAL APPARATUS AND NETWORKS IDENTIFICATION
Definition: The word "Background" refers to the conduit/piping or the covering itself in exposed areas. Elsewhere, it will correspond to a part of them.

Piping: Identify the working fluid with lettered legend and with primary and secondary colours classification and indicate direction of the fluid flow with arrows. Use arrows with double heads when the fluid flow is reversible.

Tape for legend and colour bands for arrows: canvas on the outside with plastic coating forming a protective layer and with an backing having a waterproof contact adhesive. Enroll the tape around the pipe while overlapping extremities with a length equivalent to the pipe diameter.

Locating labels made of waterproof plastic and resistant to heat, attached to tubes and pipes with a nominal diameter of 19mm or less.

Colours: Submit the legend of the classification of primary and secondary colours for approval by Engineer, if they are not included in the table below.

Table of piping and valves identification:

LEGEND FOR PIPING LABELING	LEGEND FOR VALVE LABELING	PRIMARY COLOUR	SECONDARY COLOUR
Dom. cold water	D.C.W.	light green	white
Fire Prot. water.	FIRE PROT. W.	red	white

Legends and arrows: Coloured black or white, contrasting to the primary colour.

Fire protection: Coloured white on red background.

Fire protection system: Identify the position of the flow detectors that are located at an accessible ceiling, with circular self–adhesive stickers of 12mm in diameter and colored red.

Execution: Place identification plate on piping in the following places:
- On long piping at open areas, boiler rooms, equipment rooms, in a way that there is at least one plate easily visible from any place located in the operation areas or pathways. Place the plates at a maximum of 10 m intervals.
- Near places where piping change direction.
- In each small space where the piping passes through (at least 1 plate).
- At each side of visual obstacles or where difficult to trace piping.
- At each side of each separation, such as, walls, floors or partitions.
- At places where piping is disimulated in a gutter, a technical conduit, or other restricted space, at inlet and outlet points, and near each access opening.
- At start and end points of each piping, and near equipment.

.22 OPERATION AND MAINTENANCE MANUALS
Generalities
Supply three (3) copies of instructions manuals including all installation, operation, systems maintenance data and warranty certificates.

The installation data must include:
a) The plans "As Built";
b) The installation manuals for all the equipment.
c) Shop drawings for all the equipment

The mechanical contractor must fill out the "CMMS" form provided by for each of the new installed equipments requiring periodic maintenance.

Each manual will be placed in D shape rings folders, allowing binding of mobile papers in a 215mm x 280mm (8½"x11") format.

Mechanical
a) The flow and wiring diagrams "As Built", the location and identification of all the equipment;
b) The balancing report of the hydronic networks c/w certificate The critical design points such as temperature, pressure, flow and capacities

.23 AS BUILT DRAWINGS
Annotate in red the "As Built Drawings" for the substantial completion of work approval to show on the plans, the systems and fixtures as they were installed.]

Complete the "As Built Drawings" on Autocad for the temporary reception approval respecting colours and layers convention. Drawings must not contain any notes or equipments in regards to:]
a) Notes to be re–localized, to be modified, new, existing, to link or the others of the same nature;
b) Notes of general order or instructions to the contractor;
c) No equipment parts to be removed or to be re–located;

Identify each drawing at the right lower corner, with letters at least 12.5 mm (½") heigh, as follows: "AS BUILT DRAWING: THE PRESENT DRAWING HAS BEEN REVISED AND SHOWS THE SYSTEMS/APPARATUS AS THEY ARE INSTALLED". (Contractor's signature) (date).

Submit hard copy of drawings to engineer for approval, and then make adjustments based on his instructions.

Submit the completed "as built drawings" (hard copy) to the Engineer, with the "Operation & Maintenance Manuals".

.24 SUBSTANTIAL COMPLETION OF WORK
The contractor will advise the owner and the Engineer in writing of the completion of work and will ask for the substantial completion only if the work is mostly completed, if the work cannot be finished because of condition out of his control or if the value of the work to correct is equal or less than 0.5% of the contract's total amount. In addition, the contractor must submit, to the engineer, copies of mechanical commissioning reports, etc.

The owner and the Engineer will do an inspection of work with the contractor's representative. Once the work is found to be in accordance to the plans and specifications and to the owner's satisfaction, the contractor will prepare the final estimate of the executed work value and he will ask for the approval and the payment by the owner.

The owner will retain the right to occupy and to use totally or partially one part of his building or to put in service totally or partially a part of his building before or after the substantial completion, without freeing the contractor from his responsibilities.

During the temporary reception of the works, the general contractor must supply the following documents:
a) The preliminary operation and maintenance manuals in three (3) copies for inspection including all the shop drawings stamped "APPROVED";
b) The preliminary operation and maintenance personel training program in three (3) copies.

The contractual holdback of 10 % is retained until the definitive reception of the work.

.25 FINAL RECEPTION
When the required corrections to the specified deficiencies are completed and that all the work is finished according to the terms of the final reception can be made as per tender documents. If the deficiencies are not corrected a special holdback will be retained.

.26 WARRANTY
The contractor and his subcontractors will be held responsible to repair and correct all defects that may appear during the first year after the date of the final completion of the work, and that are not caused by the inproper usage by the personnel. The corrections must be done at the contractor's expense as well as all the damages caused to the other parts of the system because of these defects.

A. TECHNICAL MECHANICAL SPECIFICATIONS

THERMAL INSULATION

.1 SCOPE OF WORK
Provide all new material and labour required to execute the thermal insulation of the following equipment and systems:

a) Domestic cold water piping
b) Fire protection piping

See in the following items the exact locations where insulation and jacketing are specified. No insulation will be installed before all tests have been executed and leaks repaired.

.2 THERMAL INSULATION
Plumbing, heating & cooling: mass of 80 Kg/m3 (5 lbs/pi3) and 25mm (1") thickness: Provide fiber glass premoulded insulation c/w all service jacket (ASJ) used as vapour–barrier which has a self adhesive strip. The application is for all new piping and all piping affected by the work:

25mm
a) Fire protection piping (from entering point in the building to mechanical room)
b) Domestic cold water piping;

.3 JACKETING
CANVAS: Provide cotton canvas, compact, rigid, plain and ULC approved of 220 g/square meter (10 oz.) flooded in a waterproof cement. The application of this type of jacketing is on all exposed insulated piping and ductwork, new or touched by the work.

a) On all exposed insulated plumbing and fire protection piping;

.4 INSTALLATION
Install insulation and jacketing only once all tests executed, leaks fixed and results approved by the Engineer. Ensure that the insulation surface and elements to insulate are clean and dry during application of the finishing cement.

The workers must be specialized in the insulation installation and registered with the Canadian Association of Insulation Products. Apply insulation on piping with the use of a fireproofing and fast drying glue. Apply the finishing products as per manufacturer recommendations.

Attach each insulation section with two (2) steel wires. Make sure not to pierce the vapour–barrier. Cover each wire with duct tape to insure vapour–barrier continuity. Afterward, if applicable, the canvas or other jacketing can be installed. Use a self adhesive tape of 50mm (2") minimum in width on all joints.

PLUMBING

.1 SCOPE OF WORK
a) Disconnect and remove all apparatus, conduits and accessories as shown or described;
b) Relocate all apparatus, conduits and accessories as shown or described;
c) Connect all new piping to existing as shown;
d) Provide all thermal insulation as prescribed;
e) Provide all identification as prescribed;
f) Paint all exposed piping as herein prescribed;
g) Provide operation and maintenance manuals, stamped shop drawings, as built drawings and a letter of warranty.
h) Train the maintenance and operation personnel as herein prescribed.

This list is not restrictive or exhaustive.

.2 PIPING, VALVES AND CONNECTIONS (General)
All work must be executed in respect with the latest version of the plumbing codes and standards.

Use eccentric reducers to change piping diameter to allow free flow of the fluid.

Above ground domestic water piping: In hard copper type L as accepted in the plumbing code.

.3 ACCESSORIES (General)
Dielectric contact: Avoid all dielectric contact. Insert a non–conductive material between two (2) metals of different composition. Use plastic rings in metallic studs.

Escutcheon: Provide for each exposed pipe passing through a wall, floor or ceiling, in a finished area, a finishing chrome escutcheon.

Expansion Joints: Provide "U" type expansion joints as shown on drawings. They must be provided with all necessary guides and anchors.

.4 PIPING SUPPORTS
Supports: The support must be made of steel or cast iron for cast iron pipes and in copper for copper pipes. The use of perforated steel strap supports is prohibited. In no case the piping must be supported directly by the structure.

Fasteners
a) In concrete: Philips Red Head
b) For steel beams and steel girders: Anvil fig. 229 or fig. 86.

Horizontal Piping Supports:
a) Copper piping: Use Anvil supports fig. CT–65 if in contact with piping or fig. 65 otherwise.

NOMINAL PIPE DIAMETER	ROD DIAMETER	MAX. HORIZONTAL SPACING
25mm and less	9.5mm	1.8m
32 to 50mm	9.5mm	2.4m
65mm	12.5mm	2.4m
75 to 100mm	12.5mm	3.0m

N.B. At location were piping is too close to slab, use figure 257 from the Anvil.

Vertical Piping Supports:
a) Copper piping: Figure CT–121 from Anvil. If the liquid temperature does not exceed 100°C (212°F), the figure CT–121C from Anvil with plastic covering can be used.
b) Installation: Limit the maximum distance between two supports to 3 m (10').

Under no circumstances the piping can be supported directly by the structure, framing, ventilation duct or other piping.

Under no circumstances, piping and duct hangers can be welded or rigidly anchored to the structure, framing or beam. A neoprene disk must be inserted between the hanger and the structure, framing or beam.

FIRE–PROTECTION

.1 SCOPE OF WORK
Provide complete systems as shown on the drawings including among others:

a) Necessary piping, valves and backflow preventers.

Execute all work according to most recent version of standards NFPA 10 & 13 and to requirement of authorities having jurisdiction.

.2 AUTHORIZATION
Immediately after acceptance of the contract, the contractor must make the necessary arrangements to the competent authorities to obtain the authorization to execute the project. He must provide all the necessary hydraulic calculations and drawings that were used to elaborate the fire protection system to be installed.

.3 PIPING, VALVES AND CONNECTIONS
PIPING: Black steel/galvanized steel, schedule 40

Fittings: To screw, to braze, to weld or to flange.

Valves: Approved by ULC for fire protection systems.
a) Butterfly valve: Anvil serie 8000FP or approved equivalent.
b) O,S & Y valve: Crane Mc Avity of approved model

BUILDING AUTOMATION

1. SCOPE OF WORK
1) Connect new water meter to building automation system (BAS). The works include among others:
   a. The wiring, the connections, adjustments and calibration of all the supplied systems
   b. Connect the 120V power supply required for the automatic controls.
   c. Prepare the control diagrams of all systems.
   d. Drilling and cutting required for the installation of all the devices
   e. The electrical wiring and conduits.
   f. Programming of new inputs from the water meter (flow rate, total consumption).
2) Provide all the identification as prescribed;
3) Provide the operation & maintenance manuals, stamped shop drawings, as built drawings, contractor warranty letter as well as the one from the controller manufacturer.
4) Give training to the maintenance and operation personnel.

This list is not restrictive or exhaustive.

2. WIRING & CONDUITS
In general, the electric equipment used will be in accordance with the prescriptions of the electrical division. All foreseen equipment will be new.

All surfaces cabling in mechanical rooms, in masonry walls and in the inaccessible ceilings, such as the plaster or metal ceilings as well as in trenches, will be in EMT conduit.

Under no circumstances will surface cabling be tolerated.

All accessible cabling in ceilings and in dry partitions can be of the type approved for plenum (type FT–6).

When required, for analog signals, for example, which are subject to interferences, twisted shield cable must be used, freely or with conduit wall, according to the aforesaid conditions.

All the electric wiring will be continuous, without joints, and will identified properly at both extremities.

All the conduits will be cleanly installed, parallel to building lines, and will be properly supported.

3. QUALIFICATIONS
Controls shall be done by Siemens Controls, which is the service contractor for this building contractor.

4. TESTS
Upon completion of the works, the control contractor must indicate the correct operation of all new controls by performing the required simulations, to the satisfaction of the Engineer.

B. ELECTRICAL TECHNICAL SPECIFICATION

1. SCOPE OF WORKS
The electrical work must include, but not limited to the demolition, supply, handling transportation, set up, installation, connection and testing/commissioning of all systems and accessories described here in and/or shown on the drawings. All systems must be fully operational.

- Remove and/or relocate some existing equipment.

1.B standards: All equipment must be CSA and/or ULC approved.

2. CONDUITS
1) The conduit installation must conform to the following:
   a. To be run parallel to the building structure, when exposed;
   b. No cutting or boring through structural elements without written permission;
   c. must be installed to facilitate the removal of equipment or parts thereof for repairs, cleaning & inspection;
   d. must be installed in a manner to facilitate future equipment installations;
   e. To hide from sight, as much as possible, all equipment, devices, conduits & wiring, from being exposed;
   f. Conduit runs must not have more than three 90° elbows and be longer then 30M (100'). Both ends must be terminated in a box. Provide cable supports in vertical runs according to the spacing shown on table 21 of the Canadian Electrical Code. The supports must be mounted in a box and manufactured by DZ Gendy. Provide a 6mm polypropylene pull rope in each conduit for future use;
   g. When a conduit or cable passes through a floor, this conduit or cable must be installed in a 40 gauge steel sleeve exceeding the floor by 50mm (2"). Fill the space between the conduit and the sleeve with concrete. Seal the space between the conduit or cable and the sleeve with a ULC and FM approved fireproof compound from Electrovert, 3M or Thomas & Betts. For all spare openings in fire separations, including concrete slabs, fill the opening with well packed fibreglass and apply 27mm (1") of refractory cement on both sides of the opening;
   h. Electrical Metallic Tubing (EMT) to CSA C22.2 No. 83. It must be used everywhere except otherwise indicated. All non concealed installations including those in technical rooms to be "EMT". Couplings and connectors to be [rain tight][set screw] type from Iberville, Columbex, Appleton or Thomas & Betts. Straps must be series 1304 from Iberville or equivalent from Columbex, Appleton or Thomas & Betts.
   i. All accessories required to install the conduits, (boxes, lugs, couplings, etc.) must be of the same type.

3. WIRING
1) Armoured type AC90 (BX) cables must be according to CSA standard C22.2 No. 51, used only for a maximum length of 10' (3048mm). They must be copper RW90, armour must be aluminium. AC90 (BX) cables are only allowed in suspended ceilings and dry walls. They must be from Canada Wire, Northern, Pirelli or Phillips. Connectors must be from series 70 by Iberville or equivalent from Columbex, Appleton or Thomas & Betts.
2) Copper wiring, type RWU–90°C for underground, type RW–90°C for wet locations and R–90°C for others, X–link 600 volts for 240V and lower connections, X–link 1000 volts for 347V and higher connections, No. 12 minimum, unless indicated otherwise.
3) Install all cables in conduits simultaneously.
4) All wiring must be color coded in the same way for the whole of the project. Use current standards.
5) Each wire must be identified with a Brady tag on the insulation at every connection and every pullbox.
6) Provide a green insulated ground wire in every conduit.

4. BOXES
Of galvanized metal, size in accordance with code, or following specific indications. All outlet and junctions boxes must be supported independently from the conduits connected to it.
   a. Recessed boxes for installation in new separations.
   b. Moulded boxes where required.
   c. PVC boxes c/w accessories.

FIRE ALARM

1. SCOPE OF WORK
1) The wiring of the fire alarm system must be installed in EMT conduits.
2) The fire alarm system must be installed and verified in accordance with ULC standards, Canadian National Building Code, Canadian Electrical Code and Ontario modifications.
3) The fire alarm system must be programmed and tested, a certificate of conformity and a verification report must be issued by the manufacturer of the fire alarm system (or its representative) stating that the system is in conformity.
4) Any modifications made to the existing fire alarm system must be verified and tested as being functional. A certificate of conformity and a verification report must be issued by the manufacturer of the fire alarm system or (its representative) stating that the system is in conformity.
5) Before programming the system coordinate the description of all zones with the owner.
6) An alert or an alarm will action all signaling devices throughout the building.
7) If possible, recess the new devices into in the walls. If the new device have to be surface mounted, provide a red box and paint the conduit the same color as the wall. If a surface mounted device shares a wall with a technical room, Route the conduit through the technical room and pierce the wall.
8) Provide certification of the complete fire alarm system stating that it is functioning properly.

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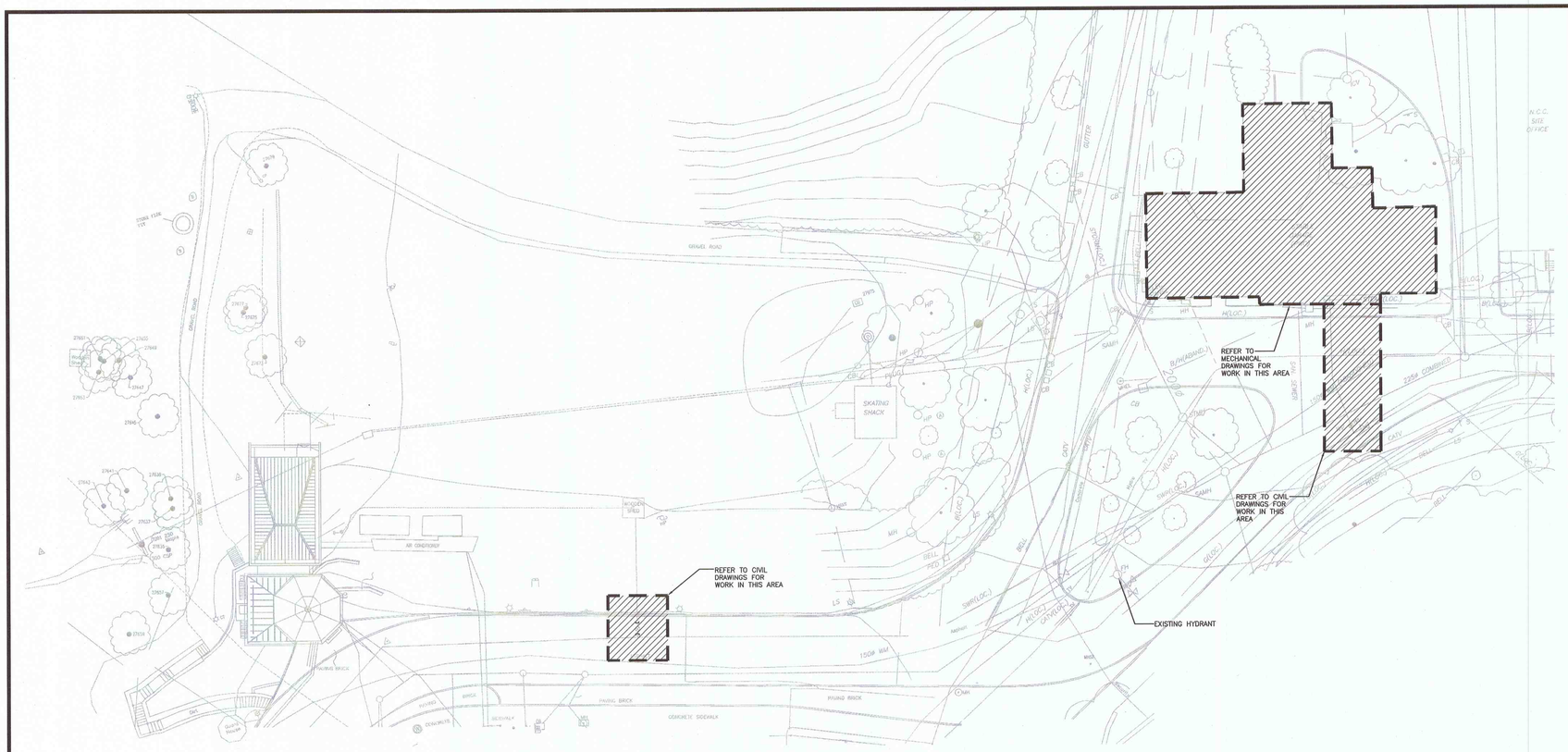
project
projet

RH INFRASTRUCTURE AND GROUNDS - SITE SERVICES - LIFE CYCLE - STABLE BUILDING

drawing
dessin

SPECIFICATIONS
MECHANICAL & ELECTRICAL

approved by / approuvé par	S. TREMBLAY
designed by / conçu par	D. RABY
drawn by / dessiné par	M. LEDUC
date	SEPT. 2013
scale / échelle	INDICATED
NCC project no. / no. du projet de la CCN	DC 1123-2-10
sheet no. / no. de la feuille	M-001



PARTIAL SITE PLAN
SCALE: NONE

SCOPE OF WORK:

GENERAL CONTRACTOR

- COORDINATION BETWEEN TRADES
- OPENINGS OF WALLS AND CEILINGS AND PATCHING. PAINTING TO MATCH EXISTING FINISHES
- DRILLING THROUGH EXTERIOR WALL TO ALLOW INSTALLATION OF NEW PIPING
- WATERPROOFING AROUND NEW PIPING (REFER TO DETAIL)
- WORK OUTSIDE THE BUILDING
- SHUTDOWN ON POTABLE WATER SUPPLY TO STABLE BUILDING IS ALLOWED TO START AT 3PM ON FRIDAY. POTABLE WATER SUPPLY TO STABLE BUILDING SHALL BE REINSTATED FOR THE SUNDAY AT NOON. AS AN ALTERNATE OPTION, SUPPLY DCW TO THE BUILDING USING A FIRE HOSE CONNECTED TO A NEARBY HYDRANT AND IMPLEMENT A FIRE WATCH IN LIEU OF HAVING AN ACTIVE SPRINKLER SYSTEM.
- SUBMIT A SCHEDULE SHOWING THE BREAKDOWN OF TASKS AND THE ANTICIPATED SHUTDOWN DURATION. SCHEDULE SHALL BE SUBMITTED AND APPROVED BY THE CLIENT PRIOR TO MOBILIZE ON SITE.
- PROVIDE UNIT PRICE FOR ROCK EXCAVATION ($/M³) AS A SEPARATE PRICE.
- GENERAL CONTRACTOR SHALL PROVIDE A COST BREAKDOWN AS FOLLOWS :

  –CIVIL WORK (FROM PLAN C–001)
  –ELECTRICAL WORK
  –PLUMBING CONTRACTOR
  –CONTROLS (FROM SIEMENS)
  –FIRE PROTECTION
  –FIRE ALARM

- HIRE AND COORDINATE WORK OF CITY OF OTTAWA APPROVED CONTRACTOR RESPONSIBLE FOR CHLORINE DISSINFECTION AND FLUSHING. THIS WORK SHALL BE DONE OVER ONE WEEK–END.

DOMESTIC WATER LINE (BY PLUMBING CONTRACTOR)

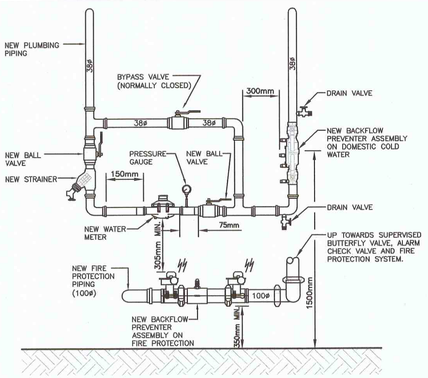
- NEW WATER METER: NEPTUNE T–10 METER, SIZE 1½ø (38mmø) C/W TRICON/E3 TRANSMITTER. ELECTRONIC DIGITAL PULSE WITH 4–20mA ANALOG OUTPUT TO PROVIDE INFORMATION ON TOTAL CONSUMPTION AND FLOW RATE. CONNECTION OF THE TRANSMITTER TO THE BUILDING AUTOMATION SYSTEM IS TO BE DONE BY THE EXISTING SERVICE PROVIDER (SIEMENS). CARRY THE COST TO HIRE SIEMENS.
- NEW BACKFLOW PREVENTER: DOUBLE CHECK VALVE ASSEMBLY SERIES 007 FROM WATTS, 1½ø (38mmø).
- PARTIAL PIPING DEMOLITION AND NEW PIPING, VALVES, STRAINER, PRESSURE GAUGE, THERMAL INSULATION.
- FLUSHING, CHLORINE DISSINFETION AND FILLING ARE REQUIRED.

FIRE PROTECTION (BY FIRE PROTECTION CONTRACTOR)

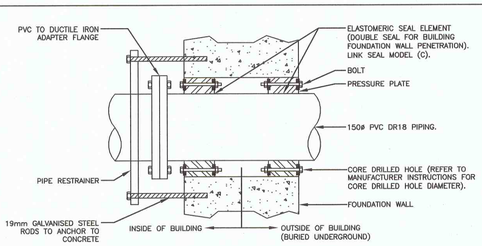
- NEW BACKFLOW PREVENTER: DOUBLE CHECK VALVE ASSEMBLY SERIES 757BFQ 4" (100mmø) (GROOVED GEAR OPERATED BUTTERFLY VALVES WITH A TAMPER SWITCH).
- PARTIAL PIPING DEMOLITION, RELOCATION, NEW PIPING AND THERMAL INSULATION REPAIRS.
- FLUSHING AND FILLING ARE REQUIRED.
- NEW AND RELOCATED FIRE ALARM DEVICES AND WIRING. FIRE ALARM TO BE DONE BY EXISTING SERVICE PROVIDER (VIPOND). CARRY THE COST FOR FIRE ALARM RELATED WORKS.

LEGEND:

- EXISTING POTABLE WATER PIPING TO REMAIN
- NEW POTABLE WATER PIPING
- EXISTING PIPING UPSTREAM OF FIRE ALARM CHECK VALVE TO BE RELOCATED
- EXISTING PIPING UPSTREAM OF FIRE ALARM CHECK VALVE TO BE DEMOLISHED
- BALL VALVE
- CONCENTRIC REDUCER
- PIPING DOWN
- GATE VALVE
- SUPERVISED BUTTERFLY VALVE
- FS SUPERVISED FLOW SWITCH
- M WATER METER
- ELECTRICAL JUNCTION BOX
- ELECTRICAL UNISTRUT
- EP REMOVE FROM THIS POINT
- RP CONNECT TO EXISTING AT THIS POINT



DETAIL - NEW BACKFLOW PREVENTER
SCALE: NONE



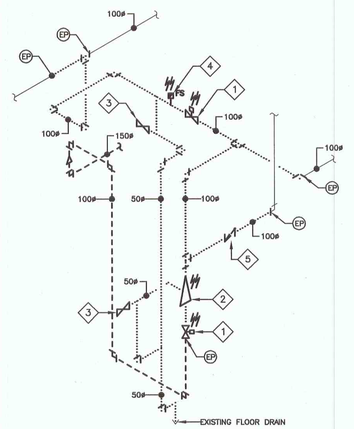
DETAIL - PIPE PENETRATION THROUGH FOUNDATION WALL
SCALE: NONE

DETAIL GENERAL NOTES

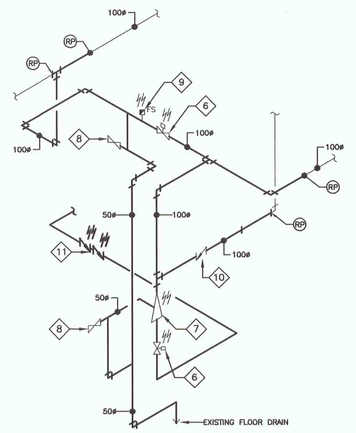
1. ISOMETRIC VIEW SHOWS ONLY PARTIAL PIPING INSIDE THE MECHANICAL ROOM.
2. ALL NEW PIPING AND FITTINGS UPSTREAM OF NEW BACKFLOW PREVENTER SHALL BE DUCTILE IRON SUITABLE FOR POTABLE WATER. ALL NEW PIPING AND FITTINGS DOWNSTREAM NEW BACKFLOW PREVENTER SHALL BE SCHEDULE 40 BLACK STEEL.

⚠ DETAIL NOTES

1. EXISTING 100ø SUPERVISED BUTTERFLY VALVE TO BE RELOCATED. REPLACE EXISTING FIRE ALARM WIRING TO ACCOMODATE NEW POSITION.
2. EXISTING 100ø ALARM CHECK VALVE TO BE RELOCATED C/W PUMP. REPLACE EXISTING FIRE ALARM AND 120V. WIRING TO ACCOMODATE NEW POSITION.
3. EXISTING 50ø TEST VALVE AND DRAIN TO BE RELOCATED.
4. EXISTING FLOW SWITCH TO BE RELOCATED. REPLACE EXISTING FIRE ALARM WIRING TO ACCOMODATE NEW POSITION.
5. EXISTING CHECK VALVE C/W AUTOMATIC BALL DRIP TO BE RELOCATED.
6. RELOCATED 100ø BUTTERFLY VALVE C/W NEW FIRE ALARM WIRING.
7. RELOCATED 100ø ALARM CHECK VALVE AND PUMP C/W NEW FIRE ALARM AND 120V. WIRING.
8. RELOCATED TEST VALVE AND DRAIN.
9. RELOCATED FLOW SWITCH C/W NEW FIRE ALARM WIRING.
10. RELOCATED CHECK VALVE C/W AUTOMATIC BALL DRIPS.
11. NEW 100ø BACKFLOW PREVENTER ASSEMBLY WITH TAMPER SWITCHES TO BE CONNECTED TO FIRE ALARM.



FIRE PROTECTION ISOMETRIC VIEW - DEMOLITION
ÉCHELLE: AUCUNE



FIRE PROTECTION ISOMETRIC VIEW - PROPOSED
ÉCHELLE: AUCUNE

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RH INFRASTRUCTURE AND GROUNDS - SITE SERVICES - LIFE CYCLE - STABLE BUILDING

drawing
dessin

MECHANICAL
PLUMBING / FIRE PROTECTION
LEGEND / SITE PLAN / DETAILS

approved by / approuvé par	S. TREMBLAY
designed by / conçu par	D. RABY
drawn by / dessiné par	M. LEDUC
date	SEPT. 2013
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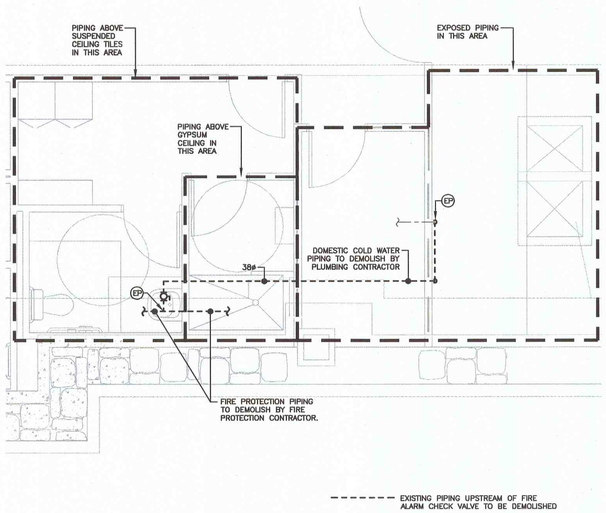
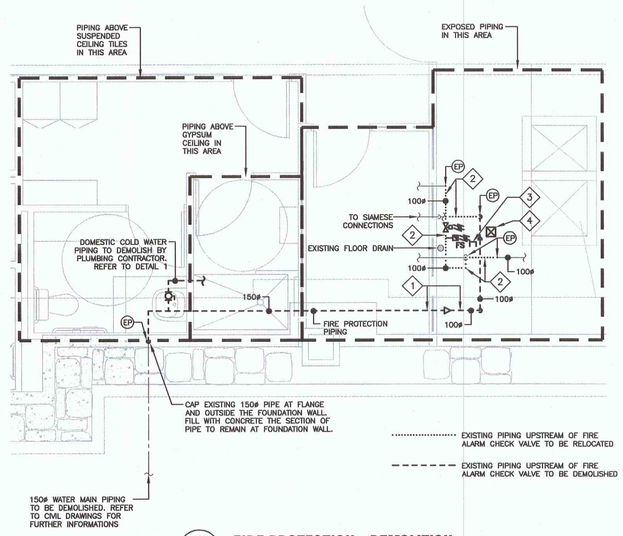


1 – PLUMBING - DEMOLITION
SCALE: 1:50

DETAIL NOTES

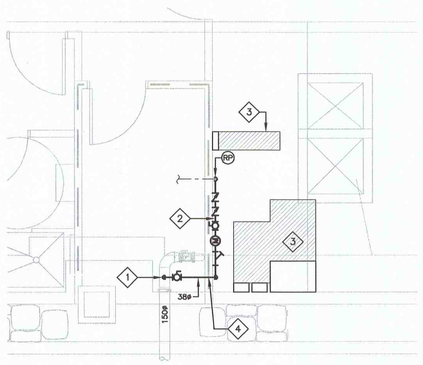
1. EXISTING PIPING UPSTREAM OF FIRE ALARM CHECK VALVE TO BE DEMOLISHED.
2. EXISTING PIPING AND ACCESSORIES TO BE RELOCATED/MODIFIED IN ORDER TO PROVIDE SUFFICIENT CLEARANCE FOR THE NEW BACKFLOW PREVENTER INSTALLATION. REFER TO ISOMETRIC VIEW ON DRAWING M-002.
3. EXISTING SLAB-TO-SLAB UNISTRUT TO BE RELOCATED C/W FIRE ALARM DEVICES (6 JUNCTIONS BOXES FOR FLOW SWITCHES, TAMPER SWITCHESM ETC.).
4. EXISTING CEILING MOUNTED FIRE ALARM JUNCTION BOX TO REMAIN.



2 – FIRE PROTECTION - DEMOLITION
SCALE: 1:50

DETAIL NOTES

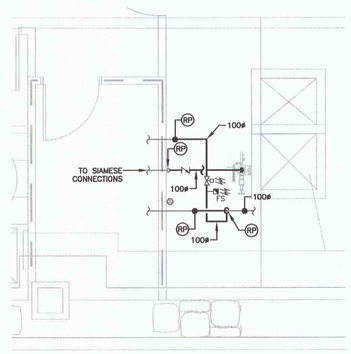
1. NEW DOMESTIC WATER PIPING TO CONNECT TO NEW 150mmX150mmX38mm TEE (TEE SUPPLIED AND INSTALLED BY THE FIRE PROTECTION CONTRACTOR.
2. NEW BACKFLOW PREVENTER ASSEMBLY AND WATER METER C/W ACCESSORIES (BALL VALVES, STRAINER AND PRESSURE GAUGE).
3. MAINTAIN 1000mm CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT.
4. MAINTAIN INTEGRITY OF WALL FIRE RATING. USE ULC APPROVED FIRESTOP SYSTEMS.



3 – PLUMBING - PROPOSED
SCALE: 1:50

GENERAL DETAIL NOTES

1. REFER TO ISOMETRIC VIEW ON DRAWING M-002.
2. ALL NEW PIPING AND FITTINGS UPSTREAM OF NEW BACKFLOW PREVENTER SHALL BE DUCTILE IRON SUITABLE FOR POTABLE WATER. ALL NEW PIPING AND FITTINGS DOWNSTREAM NEW BACKFLOW PREVENTER SHALL BE SCHEDULE 40 BLACK STEEL.



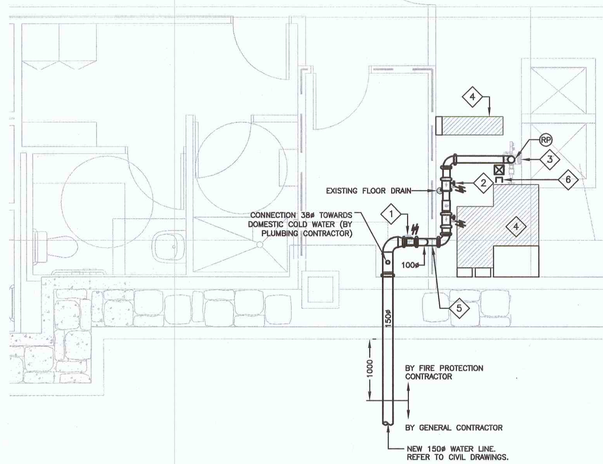
4 – FIRE PROTECTION - UPPER PORTION - PROPOSED
SCALE: 1:50

GENERAL DETAIL NOTES

1. REFER TO ISOMETRIC VIEW ON DRAWING M-002.
2. ALL NEW PIPING AND FITTINGS UPSTREAM OF NEW BACKFLOW PREVENTER SHALL BE DUCTILE IRON SUITABLE FOR POTABLE WATER. ALL NEW PIPING AND FITTINGS DOWNSTREAM NEW BACKFLOW PREVENTER SHALL BE SCHEDULE 40 BLACK STEEL.

DETAIL NOTES

1. NEW 100ø SUPERVISED BUTTERFLY VALVE. CONNECT TO FIRE ALARM SYSTEM.
2. NEW BACKFLOW PREVENTER ASSEMBLY.
3. RELOCATED PIPING C/W ALARM CHECK VALVE, BUTTERFLY VALVE, PUMPS, FIRE ALARM/ELECTRICAL WIRING. REFER TO ISOMETRIC VIEW.
4. MAINTAIN 1000mm CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT.
5. MAINTAIN INTEGRITY OF WALL FIRE RATING. USE ULC APPROVED FIRESTOP SYSTEMS.
6. RELOCATED UNISTRUT C/W FIRE ALARM DEVICES. MODIFY CONDUITS AND WIRING ACCORDINGLY.



5 – FIRE PROTECTION - LOWER PORTION - PROPOSED
SCALE: 1:50

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RH INFRASTRUCTURE AND GROUNDS - SITE SERVICES - LIFE CYCLE - STABLE BUILDING

drawing
dessin

MECHANICAL
PLUMBING / FIRE PROTECTION
DEMOLITION - PROPOSED

approved by / approuvé par	S. TREMBLAY
designed by / conçu par	D. RABY
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