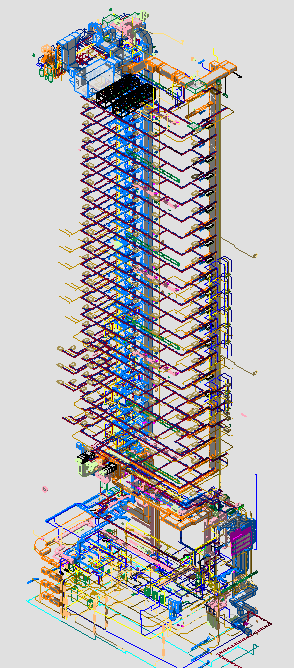
MBH Mechanical Solutions



**Division 22 00 00 Plumbing or 23 00 00 HVAC**

**Trade-specific Work Method – Mechanical**

**Project Type**: **Commercial Building – Mechanical Scope**

**Prepared by:**

**Blake, Marawan, Hameed**

**Prepared for:**

**PCI Developments**

**And for**

**BCIT 7246 Quality Management in Construction**

**Excellent work. Will you allow this work to be utilized by others per Pay-it-Forward?** As discussed yesterday, the team is ok with using the WM assignment for "Pay-it-Forward". Cheers, Marawan

**Proponent and Work Method Description**

**Type of WM:**

**Field Activity** – Commercial Buildings – Mechanical Scope of Work

**Company Name**: MBH Mechanical Solutions Ltd.

**Brief description of the Company:** MBH Mechanical Solutions is a design build commercial mechanical contractors situated in Vancouver, B.C. The Company focuses mainly on core and shell commercial buildings, concrete and wood frame residential, as well as light industrial projects.

**Company representatives:** Blake Steptoe, Marawan Beshay, Hameedullah Amir Khan

**Typical Project** for which this WM will be generally applicable includes core and shell commercial buildings. Typically for these types of projects the HVAC and plumbing systems are designed and installed in such a way that the future tenants can simply connect into the base building system upon starting their tenant fit out. The base building equipment that will be supplied is limited to any code related requirements including BC Building Code and any applicable By-Laws, owner requests, and any other AHJ compliance requirements. The systems for this type of building will be designed and constructed in way that for base building occupancy they can provide the minimum heating and cooling for the building, but when tenants start to populate the building, the system has capacity to undertake these changes.

**Brief description of the WM:**

This work method is applicable for the aforementioned type of project. This document provides a focused work method for various commercial building mechanical field activities. This document serves as a means of distributing information in regards to how MBH performs various field operations.

Note: This is a controlled document. Those listed herein are recipients for future editions.

|  |  |
| --- | --- |
| **Signature Page** | |
| **Originator:**  Name:  Date:  Signature: | **Quality Manager: Approver**  Name:  Date:  Signature: |
| **Site Superintendent:**  Name:  Date:  Signature: | **Site Foreman / Crew Leader:**  Name:  Date:  Signature: |
| **Plumbing Trade Worker:**  Name:  Date:  Signature: | **HVAC Trade Worker:**  Name:  Date:  Signature: |

As Approver and Quality Manager, with my signature, I confirm that this Work Method is the plan for the construction of the work. If the plan changes, the person making the change will notify me so that the Work Method can be revised. Alternately, I will propose suggested revisions, review with the foreman or superintendent for reissue to those on the distribution list.

As a Reviewer, my signature confirms that I have reviewed the document, and any comments to the WM have been provided to the Originator and to the Approver.

**Limitation of Liability:**

**MBH Mechanical Solutions Ltd. and any other user, authorized or not (collectively identified as The Contractor), agrees to use this Quality Plan, Quality Management Procedures, and/or Work Methods (collectively referred to as the Quality Documents) only under the condition that those that have written and provided this Quality Documents including BCIT are to be held harmless for any errors or omissions, any inaccuracies in content resulting in any damages to property or injury to any personnel that may be involved. It remains the sole responsibility of The Contractor to review any and all items contained in the above Quality Documents and to make changes that may be required in order to satisfy any specification or any regulatory or statutory obligation. As well, The Contractor shall review any and all suggested methods as contained herein and shall make any changes required and shall reissue prior to commencement of construction in order to provide a safe work site for all workers involved. Ownership and final responsibility for the use of all Quality Documents remain with The Contractor.**

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1. **PURPOSE** 
   1. **Purpose:** Theresponsibilities and methods to be used by MBH Contracting, crew leaders and site supervisors, and Formanto construct a commercial building project such as government buildings, universities, hair salons, doctors’ offices, banks, etc.
   2. This work method (WM) aims to provide guidance and to promote acceptable and best construction practices in both the plumbing and HVAC industry in British Columbia (BC). Refer to the provided checklist to ensure the quality of the work meets the required construction practices and standards.
2. **SCOPE**
   1. This work method shall apply to the construction of all commercial building that follow British Columbia (BC) Plumbing and HVAC codes.
   2. Reference Standards
      1. 2018 British Columbia Building Code
      2. 2018 BC plumbing code
      3. Vancouver Building By-law (VBBL).
      4. ASHRAE 62.1, 90.1, 89.1 & 70.1
      5. NFPA 13, 13R & 96
      6. Technical Safety BC (TSBC)

1. **DEFINITIONS and ACRONYMS**

|  |  |  |  |
| --- | --- | --- | --- |
| ABT | Air Balancing Test | O&M | Operation and Maintenance |
| CBV | Circuit Balancing Valve | PCN | Proposed Change Notice |
| CCO | Contemplated Change Order | QC | Quality Control |
| CHWS/R | Chilled Water Supply/Return | SD | Shop Drawings/Submittals |
| FCU | Fan Coil Unit | SI | Site Instruction |
| GC | General Contractor | WM | Work Method |
| HWS/R | Heating Water Supply/Return | WPT | Water Pressure Test |
| IFC | Issued for Construction |  |  |
| ITP | Inspection Test Plan |  |  |

1. **RESPONSIBILITIES AND AUTHORITIES**

**4.1 Site Supervisor (or Superintendent) - Only applicable if MBH is the prime contractor on**   **the job.**

-must work well with people and have good organizing skills. The site supervisor / QM can be an experienced plumber or sheet metal Forman and is responsible for:

• Overseeing the construction schedule at one site, start to finish.

• Overseeing the Quality Management Plan.

• Scheduling - assist with the developing of the construction schedule with both the project manager and coordinator.

• Working with the labour manager to identify potential crew leaders and other skilled workers, and the number of crews required as per construction schedule

• Serving as the primary contact to receive all the required equipment and coordinate the storage on site.

• Attending Construction committee meetings during the building of the project.

• Maintaining a site log.

• Ensuring the safety of field team and ensuring that safety practices are followed.

**4.2 Crew Leaders or Foreman**

• Crew leaders have four basic responsibilities:

• Providing on-the-job training and supervision for apprentice, and journeyman.

• Ensuring necessary tools and materials are on the site for specific tasks.

• Maintaining safety—use of equipment, protective measures for workers, conducting safety-quality tool box meetings, Safe Work Procedures (or coordinate their production with the safety officer) etc.

• Maintaining quality—the crew leaders should perform tasks that require a high level of skill. Crew leaders also should be able to quickly assess the abilities of workers. He/she must be able to teach crew members proper construction techniques answer their questions and show patience.

**4.3 The Site Safety Officer - Only applicable if MBH is the prime contractor on**   **the job.**

• Ensures that the affiliate’s safety policy is being followed on the build site at all times.

• Must not be responsible for overseeing any part of the construction process other than safety.

• Ensures that all those working at the site have completed the required safety training.

• Inspects the build site for any possible safety hazards.

• Has the authority to shut down the site, if necessary for safety reasons.

**4.4 MBH Contractor**

• Provide in-house crew and services for the physical construction (required tools, and crew) to successful finish the project.

• Provide submittals that meets the specs.

• Develop construction schedule in coordination with the Forman, and labour managers.

• Hold weekly meeting with the construction team to address any issues or concerns.

• Coordinate with Consultants any construction conflicts that is brought up by your field team.

**4.5 Plumber**

• Work directly with other sub-trades (Controls, Insulators, etc) by coordinating their schedule with them to establish a clear site for their work.

• Work with the Sheetmetal Forman to coordinate work location on site.

• Prepare for the plumbing inspection.

• Coordinate with the project coordinator/manager to develop RFIs.

• Provide a take-off and pricing for additional work that must be done or that was requested in an SI.

• Buy any materials (Fittings, valves, etc) for the job, and receive equipment and follow the proper Quality assurance and quality control (QOQC) for new equipment delivery.

**4.6 Sheet Metal Foreman**

• Work with the Sheetmetal Forman to coordinate work location on site.

• Coordinate with the project coordinator/manager to develop RFIs.

• Provide a take-off and pricing for additional work that must be done or that was requested in an SI.

• Work with the air balancer sub-contractor to ensure that sufficient air is flowing in the ducts, and temperatures are controlled.

**4.7 Project manager**

• Coordinate all aspects of the project(s) between the office and the site crew

• Ensure that proper work methods and inspection checklist are being written or edited, and used

1. **SAFETY**

**Safety is of the utmost concern on any build site, so it is important to have someone monitoring the safety conditions at all times. All Foreman shall be trained on safety requirements on the job site and informed that their safety on the job-site is MBH first priority. Ultimately, it is individuals using safe methods and making safe choices that contribute greatly to individual safety. Individuals remain personally responsible for their own safety at all times.**

All work practices and job procedures are to conform with the authority having jurisdiction and to:

* 1. All applicable instructions, codes, regulations and acts.
  2. WorkSafeBC OHS regulations and best practices.
  3. Workers Compensation System.
  4. Work Hazardous Materials Information.
  5. Gas Safety Regulation
  6. Safety Standards Act

1. **ENVIRONMENTAL REQUIREMENTS** 
   1. Care should be exercised to mitigate environmental impacts during the life cycle of this project. Provide a garbage station for solid waste and debris collection. Also, consideration of hazardous materials for tasks such as pipe or duct painting, which may cause potential hazard to human health and safety. Hazardous materials such as

* oil-based paints
* fuel
* cleaning substance
* and Polyvinyl Chloride (PVC)

Must be stored in different location away from the construction work to have less contact with humans. In addition, Forman is to ensure that the containers are not damaged prior to storage.

1. **INSPECTION AND TESTING**
   1. Please refer to the attached inspection and testing plan (ITP).

Submittals are cheap and easy way to express MBH intent of what is expected to be provided (in terms of equipment, materials, SD, or installation) before anything is being purchased or brought to site.

**8.1 Material Submittals (Contractor or Sub)**

All documentation, both current, superseded and , completed, are filed on-site in hardcopy or if being handled electrically the stored on the MBH servers, which are backed up daily to a remote site. Documents are filed in the following manner:

* + Shop drawings are produced and checked per drawings and specifications sections
  + Sent out to the GC for review and approval
  + If the SDs are accepted, MBH will receive it and store it for reference, and distribute it to field team for review prior to releasing it from the supplier.
  + If the SDs are rejected/revise & resubmit, MBH will send it back to the supplier for review and resend it again with the corrections.

**8.2 Quality Management Submittals, inspection checklist**

Inspection list: a list of items that must be checked while work is being done to avoid being missed.

Specificationswill be provided typically by the designer and from them to the Owner’s Rep and or design build contracting company. MBH material submittals shall show compliance with 2018 BC Plumbing Code, municipal, provincial and federal energy codes, BC Building Code, and ASHRAE Standards.

British Columbia Building Code (BCBC) and ASHRAE standards 90.1 and 60.1 will be the standard unless the commercial building consists of pharmacy or medical examination ASHRAE Standard 89.1 and 70.1 will be used.

1. **PROCEDURE**

The following procedure for this WM is showing a process of quality management for Plumbing and Sheet metal for any commercial building.

**10.1 Review Floor Layout and Check for plumbing and HVAC conflicts**

|  |
| --- |
| Review of the IFC drawings before the construction must be conducted to ensure that it matches the same layout in the IFT that was estimated for during the tender process. IF the layout changes after the contractor receives the award, the changes must be noted. In addition, it is important to check that there are no conflicts with other trades. |
|  |
| |  |  |  | | --- | --- | --- | | IFC and Shop Drawing Extraction | VDC Services Figure 1: Check Plans | **10.1.2 Review Plans for Plumbing and HVAC Coordination and Issue RFIs**   |  | | --- | | All plans must be reviewed by both field team and management team to ensure that any plumbing and sheet metal conflict is addressed through a formal RFI. Accordingly, any changes that may require extra labour or redesign on site would require a PCN from the consultants, followed with a takeoff from the Forman with all the extra cost. A CCO or SI must be sent before work begins. | |   **10.2.1 Review Shop Drawings and Provide Material Order to Management Team**   |  | | --- | |  | | |  |  | | --- | --- | | Schedule of Submittals Template  Figure 2: Schedule of Submittals | Prior installation of the equipment, the shop drawings review has to be done in following steps:   * It is crucial to have a current set of drawings and specifications onsite: IFC drawings with the latest revisions or the changes needs to be marked up weekly to track and record as part of documentation process. * Based on the IFC drawings and specifications, a list of Equipment and material take off need to be established. The template on the left is shown a tracking system to ensure that all ??? been captures for the project. This will include equipment such as plumbing fixtures, pipelines, HVAC equipment (Diffusers, Grilles, etc.) It is important when doing material take off to make an allowance for any re-work that might be needed, which is usually 30% of the product. * Once the list has been created, it is important to create tracking system to see the status of each: Create Excel spreadsheet to track the status: Submitted/ Reviewed/Rejected/ Ordered/ Received/Installed. Hence, some of the submittals may be still in progress of approval by the consultants. |   Approved shop drawings will have checked in section: approved/reviewed or reviewed with notes and shall have engineer stamp as a sign off. Below is an example of it. |     Figure 3: Engineer Stamp  Following the approval of all the submittals, the site team is required to review the submittals to ensure it meets the site conditions and it’s coordinated with other trades. During that stage any critical quality milestones are developed and any quality processed established. |

**10.4.1 Plumbing water pressure test, water / chlorination test, backflow Test**

###### **Plumbing water pressure test:**

###### This test is to be completed after the pipe installation, at the end of the project. In order to test the system, the foremen needs to fill the vessel or pipe system with a liquid (usually water) that can be dyed to aid in visual leak detection, and pressurization of the vessel to the specified test pressure. Pressure tightness can be tested by shutting off the supply valve and observing whether there is a pressure loss.

|  |  |
| --- | --- |
| Идет вставка изображения...  Figure 4: Testing Kit | **10.4.2 Water / chlorination test**  1. A dosage of 50 to 200 ppm of free chlorine is evenly distributed throughout the piping and fixtures.  2. Testing the residual to verify that the levels are present at the fixtures and hose bib or valve sections.  3. Contact time with the piping, undisturbed for 12 hours.  4. Retesting of the chlorine residual after 12 hours.” (what type of water treatment do I need?) |

|  |  |
| --- | --- |
| Идет вставка изображения...  Figure 5: Backflow test | **10.4.3 Backflow testing**  This test is to be done by certified plumber, as per the following procedures:   * The plumbing closes the valve, and check for changes in the gauge movement, or leaks.   During this test there are criteria that must be met for this test to pass as per the company test sheet that consists of the following:   * Ensure the check valves prevent backflow. * Ensure that the airports open when they should. * Ensure that the relief valves open before the pressure between the check valves is less than 2 PSL? below the pressure at the inlet device.” (Backflow testing process) |

**10.5.1 HVAC Commissioning and Balancing of Fan Coil Units**

Commissioning of HVAC equipment is necessary to ensure the systems are operating properly for the client as well as the end user. This procedure will go over the proper way for MBH employees to perform commissioning and balancing of 4 pipe fan coil units.

|  |
| --- |
| **10.5.2 Ensure the unit is properly installed and ready for commissioning** |
| |  |  | | --- | --- | | The first step in commissioning a fan coil unit is to ensure that it is completely connected to all services required. Review the drawings and specifications before starting this work method. Ensure that the following pipes are connected: HWS/R, CHWS/R, condensate drain pipe and pan. On the supply pipe, ensure that the shut off and control valve are installed. On the return pipe, ensure that the shut off and a circuit balancing valve (CBV). Check that all of the unit ductwork has been installed. All supply air ductwork should have 1” thick acoustic insulation. The unit should have minimum 4” clearance on the front and sides. At least 2” is required in the back of the unit. Refer to the manufacturers installation manual for required clearances beyond good practice amounts. Ensure that the thermostat (if hard wired) is connected to the fan coil unit. Start up the unit and watch for any kind of warning. If there is an electrical fault alarm, contact the electrician and do not continue with that fan coil unit. If the unit has gone into pre-start-up mode then you are ready to go onto the next step in this procedure. | Figure 6: Four-Pipe Fan Coil Unit | |  |  |     **10.5.3 Unit Start Up** |
| |  |  |  | | --- | --- | --- | | Figure 7: Fan Coil Unit Diagram |  | The fan coil unit is now in standby mode awaiting a command. The first step in this procedure should be repeated multiple times, until the entire floor, or HVAC zone group of FCUs are all in standby mode. The units should be programmed to the thermostat in the room it serves. Note the location of the installed thermostat for future reference. Refer to the following list for general guidelines on start-up. Always consult the manufacturers installation procedures as they supersede the below list.   * Check for proper fan rotation * Record electrical supply voltages * Close all unit valves and flush the system. Proceed by filling the system as required * Check for overload conditions on all units * Balance water systems as specified by the engineer or manufacturer * Balance air systems as specified by the engineer or manufacturer * Check pipping and ductwork for vibration * Verify proper condensate drainage * Reinstall all covers and access panels * Document and report all finding for future use | | Figure 8: Hydronic Schematic | | | |

**10.6.1 Pre-Occupancy City Inspection (Mechanical scope)**

It is critical to ensure that the specific mechanical portions of the building are in full working condition and have been tested before the city arrives to perform the walkthrough. The below information provides a step-by-step procedure on how to ensure the items pertaining to MBH (and its sub-contractors) have been tested so that as a company we can confidently run through our mechanical systems with the city upon their arrival for inspection.

|  |
| --- |
| **10.6.2 Review required documentation for city occupancy walkthrough** |
| |  |  | | --- | --- | | It is the responsibility of MBH Project Manager to ensure that the all of the required documentation for occupancy is obtained in time to submit to the city as required (refer to the city specific required submittal format). The items that pertain to our scope of work, or our sub-contractor's scope of work, include:   1. Fire Safety Plan (Fire Protection Sub) 2. Testing Protocols (Mech) 3. Final design drawings for all disciplines (HVAC, Plumbing, Fire protection with alternate solutions, Seismic, Controls, Pool if applicable) 4. Schedule S-B Letters of Assurance 5. Backflow reports 6. Chlorination reports 7. HVAC Balancing reports 8. Heat trace certification | Figure 9: Schedule | |  |  |       **10.6.3 Below grade stair pressurization check** |
| |  |  |  | | --- | --- | --- | |  |  | The below grade stair pressurization check is essential to us passing the city occupancy walkthrough. In order to ensure that we test this system in a consistent manor, we have established the following procedure for this work method. One at a time with each below grade stairwell pressurization, turn the fan into fire alarm mode (fully on) from the fire alarm control panel. Verify that the intake and discharge motorized dampers open prior to fan blade motion. Verify that the fire alarm panel is getting the signal from the dampers, and fan once it is operational. Next step is ensuring proper working conditions beyond fire alarm control. With the fan fully operational, use a door open pressure device to ensure that the force to open the door is between 45-90N. This operation will require at least three (3) workers with walkie talkies so they can communicate between the fire alarm panel, the fan location, and the air outlet in the bottom of the stairwell. If there is sufficient pressure in the stairwell, this portion of the test is complete. Document your findings and proceed. If the Pressure is too **low:** increase the frequency on the VFD in steps of 5% and repeat the above steps until there is adequate pressure. If the Pressure is too **high:** decrease the frequency of the VFD in steps of 5% until there is adequate pressure | | Figure 10: Below Grade Stair Pressurization  **10.6.4 Smoke exhaust system and makeup air system check.**  The smoke exhaust system is another important system to demonstrate to the city to ensure that it operates in a safe condition, and follows all applicable regulations and guidelines. Ensure that all smoke exhaust fans are monitored on the Fire Alarm Panel as well as their applicable motorized dampers. Refer to the mechanical drawings to find locations of all equipment included in this check. Ensure that the controls are working as intended on the fans. Balance the fans to the design airflow. Secondary balance the fan to “smoke exhaust mode” (ramps up 150% from normal operation mode). Document and record all findings for future use. | | | |

**10.7.1 Internal checking, and Submission of O&M Manuals**

The Operation and Maintenance Manuals are the final piece of documentation that is given to the owner upon substantial completion. They are crucial to keeping the owners trust now that the building has been handed over to them and they will be referenced for the life of the building. The following list is a general guideline for items that should be included in the O&M manuals:

* Cover page
* List of all contractors, consultants and suppliers.
* Our Guarantee/Warranty letter
* Valve tag list with all valves
* All equipment specific maintenance
* All equipment manufactures operation and maintenance manuals such as:
  + Plumbing equipment and pumps
  + Sewage pumps
  + Plumbing fixtures
  + Backflow certificates
  + Exhaust fans
  + Fluid cooler, chiller, or other
  + Water source heat pump, boiler, or other
  + Heat exchangers, tanks, separators, etc, VFD’s

10.8 Quality Requirements is on the Checklist

* **Instance 1: The Trade-Specific Check List was executed for just to check it out.**
* **Instance 2: Checklist compared to the WM procedures – do they align and does checking off the checklist include all of the elements written in the WM procedure.**

[ Submittals should be included in the checklist]

1. Trades are to ensure that all sub-trades are following Covid-19 safety requirements
2. Trades agrees to attend all required meetings within the project life cycle
3. Sub agrees to participate in QMP 4.1 Pre-mobilization meeting and QMP 4.2 Work Method Review Meeting?
4. Sub agrees to perform self-inspection of all elements of the work per plans and specs, will notify site supervisor upon ICL completion and will submit ICLs weekly.
5. Sub agrees to lead or co-lead Initial Inspection of first instance of scope per ICL and WM
6. Sub agrees to lead or co-lead QMP 10.1.1 Subcontractor Work Completion and Self-Evaluation

Top of Form

Trade-Specific Check List

Team 3: Trade-Specific Work Method (WM) & Inspection Check List (ICL) - Commercial Building Check List

\* Required

Project Name \*



Your answer

Forman Name \*



Your answer

Trade \*

Choose

Project Start Date \*

Date

Project End Date \*

Date

Limitation of Liability provided if WM provided for others to implement \*



Your answer

Inspection Form IF \*

10.1.1 Review Floor Layout and Check for plumbing conflicts

10.1.2 Review Plans for Plumbing and HVAC Coordination and Issue RFIs

10.2.1 Review Shop Drawings and Provide Order Material to Management Team

10.4.1 Plumbing water pressure test, water / chlorination test, backflow Test

10.4.2 Water / chlorination test

10.4.3 Backflow testing

10.5.1 HVAC Commissioning and Balancing of Fan Coil Units

10.5.2 Ensure the unit is properly installed and ready for commissioning

10.5.3 Unit Start Up

10.6.1 Pre-Occupancy City Inspection (Mechanical scope)

10.6.2 Review required documentation for city occupancy walkthrough

10.6.3 Below grade stair pressurization check

10.6.4 Smoke exhaust system and makeup air system check.

10.7.1 Submission of O&M Manuals

Quality Requirements \*

Trades agrees to attend all required meetings within the project life cycle

Sub agrees to lead or co-lead QMP 10.1.1 Subcontractor Work Completion and Self-Evaluation

Trades are to ensure that all sub-trades are following Covid-19 safety requirements

Sub agrees to lead or co-lead Initial Inspection of first instance of scope per ICL and WM

Sub agrees to participate in QMP 4.1 Pre-mobilization meeting

Sub agrees to perform self-inspection of all elements of the work per plans and specs, will notify site supervisor upon ICL completion and will submit ICLs weekly.

**11 Organization Chart**

**11.1 See attached Organization Chart**

**12** **REFERENCES**

12.1 Specification: supplied Ocean Park Mechanical (DB)

12.2 Schematics, and photos attached in this document

Refer to Reference list on page 21.

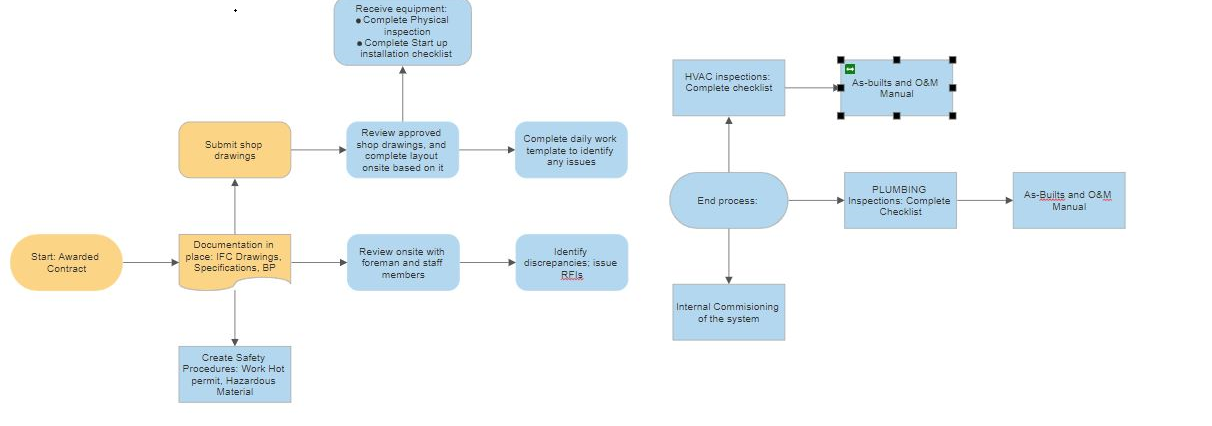
**13** **ATTACHMENTS**

13.1 Inspection Form IF (Check google form attached)

<https://docs.google.com/forms/d/e/1FAIpQLSeEO9t6WXLGly9Fsprjr0QPBOyMIpO9MRalX5uEFCUV_7TgQQ/viewform?usp=pp_url>

The link works to the Check List

13.2 Flow Chart



**References:**

Figure 1: <https://www.ny-engineers.com/vdc-services/bim/ifc-and-shop-drawing-extraction>

Figure 2**:** <https://www.smartsheet.com/managing-construction-submittals> [This template is not editable – is your copy editable? I can see value in this level of submittal breakdown, especially for your trade where each piece of equipment likely needs a submittal.]

Figure 3 Engineer’s stamp of approval

<https://www.smartsheet.com/managing-construction-submittals> and 401 Burrard project 2019

Figure4:<https://www.cleanwaterstore.com/resource/how-to-guides/how-to-sanitize-pipes-distribution-systems/>

Figure 5: <https://www.ajph.com/commercial-services/bcwwa-approved-backflow-testing-on-vancouver-island/>

Reference 4: Pressure testing methods &testing procedures, [https://esl-labs.com/pressure-testing-](https://esl-labs.com/pressure-testing-methods-testing-procedures) methods-testing-procedures

Reference 5: Backflow testing process. <https://www.cdc.gov/safewater/chlorine-residual-testing.html>

Reference 6: Fan coil unit diagram <https://www.google.com/url?>sa=i&url=http%3A%2F%2Fwww.neptronic.com%2FTechTime%2F20150716%2FWhats%2520the%2520Difference.pdf

[Mechanical Gear Wings Logo | BrandCrowd Logo Maker](https://www.brandcrowd.com/maker/logo/9575e7b9-93ac-45de-8a84-ea75064ba315/draft/c42c0eba-54ac-43d7-b5c4-64a479d20b83)

**Subcontractor Management Plan** –

<https://www.phe.gov/about/amcg/contracts/Documents/subcontractor-management.pdf>

**(End of Work Method)**