Temo Consulting

Consultancy for Engineering and Project Management

Technical Specification

For

FIRE SERVICES

Prepared For

MFMR AUKI – MALAITA PROVINCE
SOLOMON ISLANDS



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I N D E X

Page No

1 SPECIFICATION REVISION AND QA STATUS 1

2 INTRODUCTION 2

2.1 OVERVIEW OF THE INSTALLATION 2
2.2 SUMMARY DESCRIPTION OF THE FIRE SERVICES SYSTEM 2

3 GENERAL INSTRUCTION 3

3.1 COMMUNICATION 3
3.2 CONDITIONS OF CONTRACT 3
3.3 DEFINITIONS AND ABBREVIATIONS 3
3.4 REVIEW THE SPECIFICATION 4
3.5 COMPLIANCE 4
3.6 DESIGN RESPONSIBILITY 4
3.7 SUBCONTRACTOR'S RESPONSIBILITY 5
3.8 GENERAL RESPONSIBILITY 5
3.9 ERRORS, AMBIGUITIES AND OMISSIONS 6
3.10 CONTRACTOR PRICE 6
3.11 PRE-START MEETING 6
3.12 SITE MEETINGS 6
3.13 CONTRACTOR'S REPRESENTATIVE 7
3.14 APPROVAL OF DRAWINGS AND SAMPLES 7
3.15 ALTERNATIVES 7
3.16 APPROVALS 7
3.17 SHOP DRAWINGS 8
3.18 MOCK-UP INSTALLATIONS 9
3.19 PROGRAMME 9
3.20 ACTS, CODES, REGULATIONS AND STANDARDS 9
3.21 PERMITS AND FEES 10
3.22 SITE WORK 10
3.23 WORKING HOURS 10
3.24 SITE PERSONNEL 11
3.25 SITE FACILITIES 11
3.26 OCCUPATIONAL HEALTH AND SAFETY 11
3.27 COORDINATION 11
3.28 HOT AND DANGEROUS WORK 11
3.29 PROGRESS PAYMENTS 11
3.30 VARIATION ORDERS 12
3.31 DOCUMENTATION PRECEDENCE 12
3.32 QUALITY ASSURANCE 12
3.33 MATERIALS FOR CONSTRUCTION AND FINISHES 12
3.34 PROTECTION OF PEOPLE AND PROPERTY 12
3.35 PROTECTION OF EQUIPMENT 13
3.36 PROTECTION OF WORKS 13
3.37 WORKMANSHIP 13
3.38 GUARANTEE 13
3.39 WARRANTY 14
3.40 AS-BUILT DRAWINGS 14
3.41 DEMONSTRATION & INSTRUCTION TO CLIENT AND STAFF 14
3.42 COMMISSIONING, INSPECTION AND TESTING 15
3.43 OPERATION AND MAINTENANCE MANUALS 16
3.44 MAINTENANCE AND DEFECTS LIABILITY 16
3.45 PRACTICAL COMPLETION, HANDOVER AND MAINTENANCE 17
3.46 FINAL COMPLETION 17

Tender Issue

I N D E X

Page No

4 SCOPE AND DESCRIPTION OF WORKS 18

4.1 DRAWINGS 18
4.2 GENERAL SCOPE OF WORK 18
4.3 EQUIPMENT AND MATERIALS 20
4.4 TESTING, COMMISSIONING AND CERTIFICATION 26
4.5 MAINTENANCE (DEFECTS & LIABILITY PERIOD) 29
4.6 SCHEDULE OF MAINTENANCE CONTRACT 29

5 DOCUMENTATION AND DRAWINGS 31

5.1 GENERAL 31
5.2 TENDER STAGE 31
5.3 TENDER AWARD STAGE 31
5.4 CONSTRUCTION STAGE 31
5.5 HAND OVER STAGE 31

6 PRICE SCHEDULES 33

6.1 TENDER PRICE 33

7 RATE PRICES, MARGINS AND SUBCONTRACTORS 34

7.1 MARGINS' PERCENTAGES 34
7.2 SUBCONTRACTORS 34
7.3 DEVIATIONS AND ALTERNATIVES 35

8 TENDER PRICE BREAKDOWN: 36

8.1 MFMR AUKI – MALAITA PROVINCE, SOLOMON ISLANDS: FIRE SERVICES PRICE SUMMARY 36
8.2 MAINTENANCE COST FOR FIRE SERVICES 38
8.3 EQUIPMENT SCHEDULE 39

9 SCHEDULE OF UNIT RATES- FIRE SERVICES 41

Tender Issue

1 Specification Revision and QA status

Date	Rev	Issued to	No. of Copies	Approved for Issue	Comments
October 2025	0 – Tender Issue	Client/ Architect	1	PAT	

Tender Issue

2 INTRODUCTION

2.1 OVERVIEW OF THE INSTALLATION

This specification details the requirements for **Fire Services** for the **MFMR Auki – Malaita Province, Solomon Islands.**

The Fire Services covers the Automatic Fire Detection & Fire Alarm System, Emergency Warning & Intercom System and Automatic signalling equipment, portable fire-fighting equipment and all other works necessary to implement this specification.

2.2 SUMMARY DESCRIPTION OF THE FIRE SERVICES SYSTEM

All work covered by this specification shall be subject to all provisions of the Conditions of Contract and the Preliminary and General Sections of the Architectural Specification.

This section of the work shall be carried out only by Fire Services contractors who can show they have had recent and successful experience on work of a similar nature and magnitude, and evidence of this experience shall be submitted if requested.

The intent of this specification is to provide for the work herein set out and as shown on the accompanying drawings to be fully completed in every detail for the purpose designed. The contractor shall allow to supply, construct and install everything reasonably necessary for such construction to comply with the intent of the specification and drawings not withstanding any omissions in the drawings and/or specifications.

The Contract includes all work incidentals to the work shown and specified and as necessitated by the conditions of the site or of the works or of the materials as apparent or as discovered during the progress of the Works.

The intent is that all systems supplied under this contract are complete in every respect, and all items and work necessary to this shall be deemed to be included whether specifically indicated or not.

By submission of a tender the Tenderer warrants that he is expert in understanding the systems, capable of both design and construction, and that all work will be suitable for its intended function where located, and will comply with all requirements of statutory and other authorities having jurisdiction.

Tender Issue

3 GENERAL INSTRUCTION

The following general instructions shall apply in all instances.

3.1 COMMUNICATION

All communication shall be in writing and shall be with the Consulting Engineer or any person appointed by him.

3.2 CONDITIONS OF CONTRACT

Refer to the Main Building Contract for details on the “Form of Contract” for the works specified.

The said document specifies commercial, legal and tendering conditions for these works.

Any queries regarding Conditions of Contract and its interpretations for these works shall be directed to the consulting engineer before tender closing date.

3.3 DEFINITIONS AND ABBREVIATIONS

The term **“Contract”** used herein refers to the work included in this Specification, as does the term **“Sub-Contract”.**

The term **“Fire Services Sub-Contractor”** or **“Sub-Contractor”** used herein refers to the Fire Services Subcontractor, regardless of actual contractual relationships, e.g. Fire Services Sub-Contractor, Nominated Sub-Contractor, engaged to complete all works described in this Contract.

“Approved” shall mean subject to the inspection and entire approval of the Engineer before being worked or fitted into the Contract works.

“Provide” and **“Install”** used separately shall be interpreted to mean **“Provide and Install”** and shall include all design installation and testing, setting to work and maintenance.

“Indicated” or **“Shown”** means as indicated or shown on the Contract drawings, specification and by notes, figures, sketches or writing; thereon or by any combination thereof.

The terms **“Employer”, “Client”, “Principal”** and **“Owner”** refers to **FMC Pacific**

The terms **“Architect”,** which are used refers to **Kearney Architecture.**

The term **“Consultant”, “Consulting Engineer”** and **“Engineer”** used herein refers to **Temo Consulting.**

Tender Issue

3.4 REVIEW THE SPECIFICATION

The Subcontractor shall read, review, study and familiarise themselves with this specification and bring anything that they do not understand or do not agree with, under the attention of the consulting engineer before or at tender closing stage in their tender letter.

Tenderers are to make use of the tender period to clarify any aspects or inconsistencies of these documents that may influence the pricing or the execution of the contract. Any such inconsistencies found subsequent to the letting of the Contract shall have the interpretation placed upon them by the Engineer. The Sub-Contractor shall abide by this interpretation.

Requests for alternatives or changes to the Specification after tender closing shall not necessarily be accepted.

3.5 COMPLIANCE

A price for a tender complying with this specification in all respects shall be compulsory.

The intent of this specification is to provide for the work herein set out and as shown on the accompanying drawings to be fully completed in every detail for the purpose designed. The Contractor shall allow to supply, construct and install everything reasonably necessary for such construction to comply with the intent of the specification and drawings not withstanding any omissions in the drawings and/or specifications.

The Contract includes all work incidental to the work shown and specified and as necessitated by the conditions of the site or of the works or of the materials as apparent or as discovered during the progress of the Works.

The intent is that all systems supplied under this contract are complete in every respect, and all items and work necessary to this shall be deemed to be included whether specifically indicated or not.

The Fire Services system installation shall be carried out by an approved specialist Sub-Sub-Contractor under the control of this Sub-Contractor and form part of this Contract.

3.6 DESIGN RESPONSIBILITY

The design responsibility for the installation shall be with the Engineer. The Drawings show the design intent and basic principles only and shall only be used as guidance for the Sub-Contractor in producing his detailed design and shop drawings for his Works. In the preparation of the detailed design and shop drawings, the Sub-Contractor shall be responsible and take into account proper coordination of his installation with other works in the project.

The Sub-Contractor shall be responsible to the detailed design of the equipment and services and shall produce properly coordinated shop drawings together with design calculations, details and specification.

Tender Issue

3.7 SUBCONTRACTOR'S RESPONSIBILITY

The Fire Services Sub-Contractor shall be deemed to have carefully examined the Contract Documents, the Specification and Drawings. If the Fire Sub-Contractor has any doubt as to the meaning of any portion of these documents he shall inform the engineer in writing before tendering on the project. The Engineer shall provide clarifications to the query in a notice to tenderers.

The Fire Services Subcontractor must carefully consider local conditions, visit the site of the proposed work, and make any field survey necessary for proper planning and execution of the work. Failure to do so shall in no way relieve the Fire Services Subcontractor of responsibility for changes or unanticipated costs due to field conditions.

After a tender has been accepted the responsibility for any misunderstanding or error shall rest with the Fire Services Sub-Contractor. The Fire Services Sub-Contractor shall examine carefully the Architectural, Structural and other trade's drawings and satisfy himself that the work under his contract can be satisfactorily carried out without changes to the building as shown on drawings. Before commencement of his work he shall examine the progress of other trades and report at once any defect or interference affecting his own work or the warranty of same. No extras will be allowed subsequently for his omission to make adequate inspection or take adequate precaution.

The Fire Services Sub-Contractor shall arrange his own work in co-operation the other trades so that all work is installed to the best advantage. Where equipment is installed by the Fire Services Subcontractor without due regard to other trades, relocation of such equipment shall be performed by the Fire Services Sub-Contractor at his own expense.

3.8 GENERAL RESPONSIBILITY

The Subcontractor shall comply with all proper instructions issued by the Engineer or the Main Contractor in relation to this Contract.

The Subcontractor shall be responsible for the adequacy, stability, and safety of all its site operations and method of construction.

The Subcontractor shall respect the rights of the adjoining areas occupants and shall advise the main contractor when access to areas out of construction areas is requires for the purposes of carrying out the Contract Works.

The Subcontractor warrants that at all times shall be suitably qualified and experienced, and shall exercise due skill, care and diligence in the carrying out and completion of Works under Subcontract (WUS)

The Subcontractor shall carry out and complete WUS in accordance with the design documents so that the Subcontract Works, when completed, shall:

a) be fit for their stated purpose; and
b) comply with all the requirements of the Subcontractor

Tender Issue

3.9 ERRORS, AMBIGUITIES AND OMISSIONS

Errors, ambiguities and omissions in drawings or specifications shall be reported to the Engineer for correction before any part of the work involved is started. Unless otherwise expressly stipulated, no additional allowance shall be made because of errors, ambiguities or omissions which should reasonably have been discovered during the preparation of the tender or which may become evident later and which should have been directed to the attention of the Engineer in timely manner. The written decision of the Engineer shall be final.

3.10 CONTRACTOR PRICE

A lump sum fixed price excluding taxes is required. The price shall not be subject to variation for the duration of the contract period.

The Contract includes all work shown and specified and as necessitated by the conditions of the site or of the works or of the materials as apparent or as discovered during the progress of the Works.

By submission of a tender the Tenderer warrants that he is expert in understanding the systems, capable of both design and construction, and that all work will be suitable for its intended function where located, and will comply with all requirements of statutory and other authorities having jurisdiction.

3.11 PRE-START MEETING

The Sub-Contractor shall prior to commencing with the Sub-Contract Works on site, shall attend a pre-start meeting to be held at the address and time mutually agreed with the Main Contractor.

The meeting may address the following matters:

a. construction and site specific issues;
b. lines of communication and authority levels;
c. possession of the site;
d. frequency and venue of site meetings;
e. progress payments;
f. working hours;
g. safety requirements;
h. insurance;
i. scope of works;
j. programs; and
k. resources.

3.12 SITE MEETINGS

A senior and responsible representative of the Fire Services Sub-Contractor's staff with powers of making binding decisions on behalf of the Fire Services Sub-Contractor shall attend all site meetings called by the Construction Manager or Project Manager.

Tender Issue

3.13 CONTRACTOR'S REPRESENTATIVE

The Sub-Contractor shall provide all necessary supervision during the Contract. He shall be at site at all working hours, a competent representative whose name shall be notified to the Main Contractor and Engineer in writing and who shall be authorised to receive on behalf of the Subcontractor any instructions from the Main Contractor, Engineer or Engineer's Representative.

All works shall be carried out under the supervision of the Sub-Contractor's representative.

3.14 APPROVAL OF DRAWINGS AND SAMPLES

Within ample time to prevent construction delay, the Sub-Contractor shall submit to the Engineer samples of all Part and equipment for approval. The Sub-Contractor shall also submit 2 sets of final shop drawings detailing all aspects of proposed work for approval.

The Sub-Contractor shall not enter into any commitment or commence any work without the approval of the shop drawings and materials samples by the Engineer.

Consent shall not relieve the Subcontractor from his obligation to comply with this specification. Supply without delay, any samples, information or drawings requested by the Engineer.

3.15 ALTERNATIVES

The Subcontractor is encouraged to forward alternatives for both the design and specified equipment and the installation, provided that full details of these alternatives and prices are forwarded with their tender under cover of their tender letter.

Nomination of particular manufacturer, reference, or source of supply shall be taken, unless specifically noted otherwise, to indicate type and quality required.

Any alternative equipment shall meet or exceed the specified equipment and installation in all respects as follows but not limited to the following:-

- Performance and duty.
- Maintenance and spare parts.
- Durability.
- Energy efficiency.
- Life cycle costs analysis.

All costs associated to prove the above shall be borne out by the Subcontractor.

3.16 APPROVALS

All approvals of documents and site work shall be performed by the consulting engineer or any person appointed by them.

Tender Issue

3.17 SHOP DRAWINGS

The Sub contractor shall prepare installation drawings for shop fabrication and working drawings for installation on site. All dimensions and locations shall be verified on site. Shop drawings shall be submitted for review by the Engineer before manufacture. The review of any drawings by the Engineer in no way affects the Sub-Contractor's responsibility for the satisfactory completion of the work.

The Fire Services Subcontractor shall review all relevant drawings, including architectural, structural, other services and co-ordinate and co-operate with the main contractor and the relevant subcontractors to avoid conflict with the building structure and other building services. Any changes required due to this co-ordination shall be provided at no extra cost.

The shop drawings shall include all details necessary for the proper accommodation of the plant as a whole. This includes all foundation, and fixing bolts details, access details etc. Accurate shop drawings are to be provided for the penetration and cast in requirements for the pre-cast concrete panels for both walls and floor panels.

Should any alterations be necessary due to errors in, or late availability of information from the Sub contractor, all charges incurred in the correction or alteration shall be to the Fire Services Subcontractor’s expense.

Shop drawings shall show at least the following general categories of information as follows:

i) Penetrations through floors, walls, and other structural members;
ii) Plinth details;
iii) Equipment positions and operating weights;
iv) Entry positions, access routes, weight of equipment or components during delivery to site;
v) Services access openings;
vi) Location, details of concealed/buried conduits, inserts, and pipes;
vii) Temporary openings in floors/walls;
viii) Detailed workshop and manufacturing drawings;
ix) Equipment schedules;
x) Electrical wiring and control diagram;
xi) General layout plans and sections (with applicable scales);
xii) Schematic diagram;
xiii) Support and mounting details;
xiv) Material/Component specifications;
xv) Setting out dimensions and level; and
xvi) Interfacing details and co-ordination with architectural, structural and other Sub-Contract Works.

Shop drawings shall be constantly updated to reflect modifications and changes agreed/accepted by the Engineer and to reflect design changes issued by Engineer’s instructions.

If there should be any alterations that are necessary due to errors in, or late availability of information from the Contractor, all charges incurred in the correction or alteration shall be to the Fire Services Contractor’s expense.

Tender Issue

Installation works carried out by the Sub-Contractor before the relevant shop drawings submitted and approved by the Engineer are at the Sub-Contractor's own risk.

3.18 MOCK-UP INSTALLATIONS

The requirements of mock-ups stated in the Main Contract or as specified in this Specification shall be included in the Sub-Contract.

3.19 PROGRAMME

The Tenderer shall submit a programme of works with their tender in Gantt Chart Form, specifying Tasks, Duration, Resources and dependencies between scheduled tasks. The critical path activities and milestones shall be identified. This programme shall be kept updated at all times for the entire duration of the project.

3.20 ACTS, CODES, REGULATIONS AND STANDARDS

All work in respect to materials and workmanship shall meet or exceed relevant local and overseas engineering standards, best practices and recommended methods.

In particular, relevant applicable sections of the following standards shall be deemed part of this specification.

FIRE DETECTION & FIRE ALARM SYSTEM, FIRE HYDRANTS, HOSE REELS AND FIRE EXTINGUISHERS

NBC	National Building Code of Solomon Islands
NZS4512	Fire detection and alarm systems in buildings
NZS4510	Fire hydrant systems for buildings
NZS4503	Hand-operated fire fighting equipment – portable & wheeled fire extinguishers, fire hose reels, fire blankets and other requirements in buildings.
AS-NZS1841	Portable Fire Extinguishers
AS-NZS1221	Fire hose reels
NZS4514	Interconnected smoke alarms for houses
NZS5807	Code of practice for industrial identification by colour, wording or other coding
AS-NZS3000	Electrical Installations (or the Australian/ New Zealand Wiring Rules)

EMERGENCY WARNING & INTERCOMMUNICATION SYSTEM

NBC	National Building Code of Solomon Islands
NZS4512	Fire detection and alarm systems in buildings
AS4428	Fire detection, warning, controls and intercommunication systems
AS60849	Sound Systems for Emergency purposes
AS1670	Fire detection, warning, controls and intercommunication systems
AS-NZS3000	Electrical Installations (or the Australian/ New Zealand Wiring Rules)

Tender Issue

AUTOMATIC FIRE SPRINKLER SYSTEM

NBC	National Building Code of Solomon Islands
NZS4541	Automatic Fire Sprinkler System
NZS4515	Fire sprinkler systems for life safety in sleeping occupancies (up to 2,000 square meters)
NZS4442	Welded steel pipes and fittings for water, sewage and medium pressure gas
AS1074	Steel tubes and tubular threaded for ordinary service
NZS5807	Code of practice for industrial identification by colour, wording or other coding
AS2941	Fire pump set systems

All works shall comply with Local Electrical Regulations, Municipal Authority Regulations, Health and Safety Regulations, Local Telecomm Authority Regulations and in particular, the Local Fire Authority Requirements.

Where a New Zealand or Australian standard is not available, the relevant British standard shall be used and the standards shall take precedence in the above stated order. Where standards are not available, acceptable engineering standards shall be forwarded for approval.

Equipment suppliers and manufacturers' recommendations shall be closely followed with respect to both the installation and commissioning.

The latest issue/revision of all the above documents at the time of tender shall apply in each instance.

3.21 PERMITS AND FEES

The Fire Services Subcontractor shall give all necessary notices, obtain all necessary permits and pay all fees in order that the work may be carried out, and shall furnish all certificates as evidence that the works installed comply with laws and regulations. Bring to the attention of and clarify any unusual aspects of the installation with the relevant Authority during the permit application period.

Pay all fees and costs relating to patent rights, trademarks, or other protected rights and fully indemnify the Owner against any claims arising there from.

3.22 SITE WORK

Site work shall be performed in a workman like manner and the site shall be kept neat and tidy.

3.23 WORKING HOURS

For the duration of the contract works, the official working hours shall be coordinated with the Main Contractor prior to commencement of the Contract

Tender Issue

3.24 SITE PERSONNEL

The work shall be performed by people with the necessary experience, qualifications and registration to perform the work.

Documentation to this effect shall be submitted to the Client's Representative before any workmen will be allowed on to the site.

3.25 SITE FACILITIES

All site facilities shall be supplied by the Sub-Contractor inclusive of communication, storage, office and ablutions.

3.26 OCCUPATIONAL HEALTH AND SAFETY

The Contractor shall ensure that all personnel are fully trained in matters relating to work safety. The Contractor shall ensure that their personnel are fully equipped with safety equipment and that a strict regime of safety is followed on site that complies with local OHS (Labour Department) Authority requirements.

3.27 COORDINATION

The Fire Services Sub-Contractor shall at all times liaise with other Sub-Contractors, the Main Contractors, the Project Managers, and the Engineer to ensure that works are carried out in a timely, orderly faction so as to minimise delays, disturbances and damages to any equipment or property.

All routes of piping, ducting and cables and location of all equipment shall be agreed in advance, shown on shop drawings and not varied during the installation.

3.28 HOT AND DANGEROUS WORK

All minor and major hot work and work that could cause bodily harm or work that is a fire hazard for example grinding, sawing, cutting, welding, soldering and brazing shall not proceed without Main Contractor OHS officers, Project Manager or from the Consulting Engineer's permission.

3.29 PROGRESS PAYMENTS

Progress payments for sectional completion shall be based on work completed and commissioned less retention moneys.

Quantity measurements for the purpose of valuing Progress Claims shall be taken from the Drawings issued by the Architect and/or Engineer.

Tender Issue

3.30 VARIATION ORDERS

Variation Orders (VO) shall be based on the prices indicated in the Schedules of Rates (SOR) that has been submitted by the Contractor during the Tender stage.

If some items and works to be claimed are not specified inside the SOR, these shall be justified by submitting the VO together with the supporting documents like, Engineer's Instructions, drawings purchased orders and receipts.

3.31 DOCUMENTATION PRECEDENCE

This specification shall take precedence over other documents except in the case where it contravenes a local law or local authority regulation.

In case of document discrepancy or ambiguity, the matter shall be referred to the consulting engineer for a ruling which shall be final and binding to all parties.

3.32 QUALITY ASSURANCE

The Sub-Contractor shall submit with his tender a draft quality assurance plan indicating his quality control plan with hold points to be signed off by his personnel as well as the consulting engineer to ensure the quality of the installation.

The consulting engineer may add additional hold points or procedures if required.

3.33 MATERIALS FOR CONSTRUCTION AND FINISHES

The materials used in the construction of the equipment are to be of the highest quality of their respective kinds.

All parts liable to rust, including screws, bolts and nuts shall be cadmium plated or hot dipped galvanised. All metalwork in this Contract including switchboards, distribution boards, cable tray, trunking, cable ladder, support brackets etc. shall be protected against corrosion, to the satisfaction of the Engineer.

3.34 PROTECTION OF PEOPLE AND PROPERTY

Insofar as compliance with the Sub-Contract permits, the Sub-Contractor shall:

a. Take measures necessary to protect people and property;

b. Avoid unnecessary interference with the passage of people and vehicles; and

c. Prevent nuisance and unreasonable noise and disturbance.

If the Sub-Contractor damages property, the Subcontractor shall promptly rectify the damage and pay any compensation which the law requires the Subcontractor to pay.

Tender Issue

3.35 PROTECTION OF EQUIPMENT

All equipment delivered to the site for the Contract works shall be adequately protected during transport and adequately protected during storage on site and elsewhere. Damaged equipment shall be totally replaced with new items.

3.36 PROTECTION OF WORKS

3.36.1 General

The Subcontractor shall be responsible for taking all reasonable steps to avoid other trades or environmental conditions from damaging or disfiguring equipment or materials of this Contract by protecting the works adequately at appropriate stages of the Contract programme. The Subcontractor shall liaise with the Main Contractor and other trades in this regard.

The Subcontractor shall adequately protect equipment and incomplete works in areas exposed to the weather.

The Subcontractor shall arrange site access with the Construction Manager. The Subcontractor shall comply with all site security provisions set by the Construction Manager.

3.37 WORKMANSHIP

3.37.1 General

Carry out all work in a neat and serviceable manner. Follow best trade practices and comply with any manufacturer's recommendations.

Confirm positioning of all fixtures with the Engineer before installation. Confirm mounting height and location of all fittings before installation.

3.37.2 Finish & Cleaning

The completely erected installation shall be handed over in a perfectly clean condition with all rust and dirt removed paintwork in good clean condition with erection scratches and other damage marks made good and bright parts properly cleaned and polished.

Keep the work areas clean and tidy at all times. Remove all rubbish as it accumulates. On completion, remove all debris and waste caused directly or indirectly by the work and leave the installation and surrounding areas completely clean.

3.38 GUARANTEE

The Fire Contractor shall provide a written guarantee in respect of all materials supplied under the Contract against defects which may occur or be found in workmanship, materials and design for a period of twelve (12) calendar months in service after the date of Practical Completion Certificate as detailed below.

Tender Issue

All defects, fair wear and tear excepted, shall be made good free of all costs to the Owner, whether or not the workmanship and materials have been previously inspected and accepted.

3.39 WARRANTY

The complete installation shall be guaranteed free of defects and faulty workmanship for a period of 12 calendar months after the date of issue of Practical Completion Certificate.

Any defects during this 12 months shall be repaired/replaced free of charge inclusive of parts and labour.

Any equipment attended to during this period shall have an extended guarantee period of another 12 months from date of repair.

Where equipment supplier's offer extended warrantees in excess of 12 months, they shall be passed unto the Client for their benefit.

3.40 AS-BUILT DRAWINGS

A draft of the As Built documents shall be provided to the Engineer four weeks prior to Practical Completion for approval. Provision and acceptance of final as-built, commissioning, and maintenance documentation shall be a prerequisite for Practical Completion.

"As Built" drawings, to the approval of the Engineer shall be provided for the Contract Work. These shall be in similar detail to the installation drawings, but shall also include any amendments and any additional detail necessary to show the functioning or installation, or particular items of plant.

The approval of any drawings by the Engineer in no way affects the Fire Services Subcontractor's responsibility for the satisfactory completion of the Contract.

3.41 DEMONSTRATION & INSTRUCTION TO CLIENT AND STAFF

The Fire Sub-Contractor shall provide all instructions to members of the Client's organisation as necessary for them to recognise defective conditions in the Contract plant. Formal instruction shall be coordinated with the Client via the Main Contractor and shall take place following provision and acceptance of final as-built plans, commissioning, and maintenance documentation, and prior to Practical Completion.

The Sub-Contractor shall also provide such informal instruction as may be required prior to the formal instruction. The fire sub-contractor shall assign a person thoroughly familiar with the Contract plant for the purpose of such instruction for a period of 2 complete days during which period his time shall be completely given over to instruction. Instruction shall be given as follows:

- Explain the function and operation of all equipment, and indicate where these items are dealt with in the Operating and Maintenance instructions.

Tender Issue

- Demonstrate all indicating instruments, gauges and settings of equipment and indicate the current readings of such items.
- Indicate where and how any item of Contract equipment can be disconnected or isolated.

3.42 COMMISSIONING, INSPECTION AND TESTING

Four weeks prior to carrying out any inspections, testing and commissioning, Contractor to submit details of the test procedures proposed (or method statements), together with Test/Report Sheet formats for the Engineer's review. These procedures and formats, once acceptable to the Engineer, shall be used as the basis of all Inspections, Testing and Commissioning.

Prior to inspection/commissioning of the Works by the Engineer for the purposes of certifying Practical Completion, provide the Engineer with completed, signed Fire Certificate of Compliance, Test/Inspection/Commissioning Reports on the equipment, services, etc., indicating that the Works are now ready for inspection. The contents and results of these Reports must be acceptable to the Engineer, and are an essential prerequisite to the Engineer proceeding with inspection/commissioning of the work for the purposes of the issue of the Certificate of Practical Completion.

The Certificate of Practical Completion does not become due until site testing and commissioning is complete to the satisfaction of the Engineer, and the completed Certificate of Compliance issued to the Engineer.

Arrange for Subcontractors to be in attendance where inspection testing and/or commissioning of the installation involves their equipment and where specifically requested herein.

Repair or replace as instructed by the Engineer, at no charge, any item or features not complying with these Documents.

Allow the Engineer and any relevant local bodies the opportunity of attending and witnessing the tests and commissioning. Include the following in the test procedures as a minimum:

- Automatic Fire Sprinkler System Alarm function test
- Fire Sprinkler piping Static & Pump Pressure Test
- Water Supply Flow Test
- Pump Run On/Off Test
- Flow/Pressure switch Test
- Valve Monitor Test
- Fire (Smoke, Heat, etc.) Detectors Tests
- Fire Alarm Devices Tests
- All piping and connection to equipment shall be pressure tested to the requirements stated elsewhere in this specification or to minimum of 1.5 times the working pressure or as per minimum requirement by Code.
- All Tests shall be carefully pre-planned and scheduled to ensure that they are co-ordinated with the work of other relevant trades involved and that they are carried out in safe and efficient manner with the minimum of inconveniences to all concerned.

Tender Issue

- Check all control panels for operation of switches, circuit protection, contactors, controls etc.
- Continuity and insulation resistance checks on all wiring and cabling.
- Check all labelling.
- Check fixings of all equipment and systems installation to ensure stability under possible seismic conditions.
- Provide approved written test result from the National Fire Authority.
- Test and commission all components, items, circuits and systems both independently and in association with the complete installation.
- Allow to employ the manufacturers of any specialist equipment installed to test and commission that equipment.
- After commissioning give at least two weeks' notice in writing to the Engineer that the installation is ready for final demonstration.
- Demonstrate the satisfactory operation of the installation and all component parts to the satisfaction of the Engineer.
- Provide all equipment and apparatus necessary for this demonstration.
- Carry out any tests the Engineer may require to demonstrate that the installation functions as specified or intended.
- Inspect and test the complete system in accordance with the codes specified in this specification, local National Building Code of Solomon Islands and Local Fire Authority.

3.43 OPERATION AND MAINTENANCE MANUALS

Provide 3 sets of Operation and Maintenance (O&M) Manuals bound and indexed in Black A4 ring binders labelled with the project name and purpose on the front cover and spine. The manuals shall include the following information:

- Brief outline description of systems and principal design details.
- System schematics.
- Operating instructions for the equipment installed.
- Schedule of all equipment showing location, maker's name and details of local agent.
- Provide spare parts lists, manufacturers' technical information, with detailed wiring diagrams for all composite equipment.
- A description of recommended maintenance procedures and the desirable frequency thereof, recommended lubricants, and recommendations for locating faults and isolating equipment.
- Commissioning results, copies of works test certificates.
- A set of As-built drawings in A3 shall be provided for inclusion in each copy of the Manual.

3.44 MAINTENANCE AND DEFECTS LIABILITY

The Maintenance and Defects Liability Period shall extend for a period of twelve (12) calendar months from the date of Practical Completion. During the maintenance and defects liability period the Contract Plant shall be under the control of the Owner but the Subcontractor shall be in attendance and shall carry out all maintenance work as maybe required at no cost to the Owner.

Repair any defect which does not compromise the effectiveness of any system, excluding fair wear and tear within 7 days during the maintenance period specified.

Tender Issue

Defects which do comprise the effectiveness of the system shall be repaired within 24 hours. Failure to do so will result in the work being done by others at the Fire Subcontractors expense.

3.45 PRACTICAL COMPLETION, HANDOVER AND MAINTENANCE

After all test adjustments and commissioning have been completed to the satisfaction of the Project Manager and provided all the requirements of the specification have been met to the satisfaction of the Engineer a certificate of Practical Completion will be issued.

3.46 FINAL COMPLETION

Final completion shall be considered achieved when the Maintenance and Defects Liability Period has been satisfactorily completed and all specified requirements have been met to the Engineer's satisfaction.

Tender Issue

4 SCOPE AND DESCRIPTION OF WORKS

4.1 DRAWINGS

The following drawings, including all the architectural drawings and site layout drawings forms part of this specification and shall be read in conjunction with this specification:-

S/N	Dwg No.	Description
1.	F0000	Drawing Schedules, Legends & Symbols, General Notes, Equipment Details and Abbreviations
2.	F0100	Ground Floor Plan – Fire Services Layout
3.	F0200	First Floor Plan – Fire Services Layout
4.	F-SCHEM	Schematic Diagram
5.	F-MISC	Miscellaneous Detail

4.2 GENERAL SCOPE OF WORK

The scope of work includes the supply, installation, commissioning and final certification from the National Fire Authority, for **Fire Services** for the **MFMR Auki – Malaita Province, Solomon Islands.**

All works necessary to provide a fully functional and compliant system as detailed in this specification and drawings shall be carried out. These works shall include any minor works and/or materials not explicitly stated but necessary to implement the services required.

The contractor shall make allowance in terms of cost and time for all necessary equipment and materials required to implement this specification whether or not explicitly stated and whether or not permanently installed upon completion. These items shall include but not be limited to hiring of equipment, fastening materials, minor building works such as penetrations for cables and support systems.

4.2.1 Main Components within Scope of Works

The scope of these works shall include but not be limited to the following major equipment and services:

4.2.1.1 FIRE DETECTION & FIRE ALARM SYSTEM (FDAS)

- Supply and installation of detectors, manual call points, speakers, strobes, horn-strobe, monitoring & control modules, fire door auto-openers/closers (if any), emergency escape magnetic doors modules, and other ancillary devices that are connecting to the Addressable Fire Alarm Panel. Layout and locations are as indicated in the drawings.

Tender Issue

- Supply and installation of Addressable Fire Alarm Panel, with properties according to specifications, connection links and accessories. Location is as indicated in the drawings.
- To provide fire detection and fire alarm systems interface connection fire-rated cabling, conduits & trunkings (as required), contacts, relays, and other necessary devices of the required interface terminals of control panels, distribution panels/boards, BMS panels (if any), and monitor/control modules of other equipment/devices to be connected to the Fire Alarm Panel.
- To provide fire detection and fire alarm systems fire-rated cabling, conduits & trunkings (as required) from every fire detecting, alarming and signalling devices to be connected to the Fire Alarm Panel.
- To provide for future connections and expansion at the Addressable Fire Alarm Panel. These include but not limited to interface connections of component modules for the AHU, other mechanical equipment, lift homing system, emergency escape magnetic doors, other fire-fighting ancillary services, and future expansion.

4.2.1.2 FIRE EXTINGUISHER SYSTEM

- Supply and installation of Fire extinguishers, 2.5kg and 4.5kg Dry Powder Fire Extinguishers (ABE) types with tamper-proof cabinets, signage and mounting brackets. Locations are as indicated in the drawings.
- Supply and installation of Fire extinguishers, 5kg Carbon Dioxide Fire Extinguishers (CO_2) types with tamper-proof cabinets, signage and mounting brackets. Locations are as indicated in the drawings.
- Supply and installation of Fire Blankets with signage and accessories at locations as indicated in the drawings.
- To provide, facilitate, pay fees and other charges for the acquisition/completion of the Hydrant System Certification (HSC) for the project as per required in the code NZS 4510.

4.2.1.3 GENERAL

- Contractors to conduct site survey during tender stage to verify locations of existing fire system.
- Provision of all necessary scaffoldings, platforms and scissors lifts.
- Minor penetrations less than 100 mm in diameter and making good of the same.
- To provide shop drawings, material submittals, As-Built Plans, O&M Manuals, Manufacturer's Documentation and Client Instruction.
- Maintenance and attendance to faults, including labour and materials for the defects liability period.
- To provide, facilitate and coordinate the Testing & Commissioning of Works, Local Fire Authority Inspections and Final Certification and other necessary fees and charges for the completion and certification of the Works.
- All Fire Services Works included in this Contract are to be in accordance all relevant Local and AS-NZS Standards.

Tender Issue

4.2.2 Exclusions

The works excluded from this specification are:

- Builders work such as major building penetrations, chasing of wall and columns for installation of Fire Services equipment and making good of these building works.
- To provide fire-rated and electric power supply for the Fire Alarm Panel and other required fire alarm devices/sensors.

4.3 EQUIPMENT AND MATERIALS

All Electrical wiring shall fully comply with AS3000, SAA Wiring Rules. The equipment used and workmanship employed shall comply with this standard. The earthing of enclosures such as the Fire Alarm Panel, Enclosures and Sub-Circuits shall comply with AS3000.

All fittings, systems and equipment used for the Fire Services shall fully comply with the Fire Services Standards listed in Clause1.3.

All circuits and devices such as manual call points, sounders and circuits shall be labelled clearly with minimum 5 mm high red lettering on white *Traffolite* background or approved equivalent systems.

4.3.1 Fire Alarm Control Panel

The addressable/conventional Fire Alarm Control Panel, or Fire Indicator Panel, or the Fire Indicator Panel/Fire Alarm Panel (FAP) shall be microprocessor based and shall be capable of future addition of smoke and heat detectors, manual call points to selected locations within buildings, without replacement of the fire indicator panel or the main building fire alarm trunk wiring.

The FAP shall be located in the external wall of the building, Fire Command Centre (FCC) or as indicated in the drawings.

Alarm zone circuit shall also be provided for the following conditions:

i) Flow through the fire sprinkler installation control valve sensed by its pressure switch. One indication for each installation control valve.
ii) Operation of each fire pump set.
iii) Phase circuit failure of the power supply to each fire pump set.
iv) Low and high water level in each tank.
v) All visual indicator shall be of dual LED or approved equivalent.
vi) A fire brigade signalling transmitter of the electrically operated continuous signalling type accepting to the NFA shall be provided. Provision shall be made for connection to the fire alarm monitoring company.
vii) All indicators, switches and instruments shall be clearly labelled by means of engraved *traffolyte* black-white-black labels in approved equivalent.
viii) All wiring shall be colour coded and neatly bound with plastic straps. Outgoing cables shall be terminated at a readily accessible, labelled terminal strip.

Tender Issue

ix) Provision shall be made either directly from the pumps, tank, etc. or via the FIB for Building Automation System's contractor connection.

x) Spare alarm zone circuits shall be provided as indicated on the drawings for future extension.

4.3.1.1 Sequence of Operation

1. Activation of any single smoke detector in any building detector zone shall:
   a. Cause a first-stage fire alarm.
   b. Energize a lamp on the activated detector and identify detector on the display of the Fire Alarm Control Panel (and remote indicator/MIMIC Panel, if included).
   c. Facility officers shall conduct an alarm verification within 120 seconds of the first stage alarm. If unattended within the prescribed time, a second stage alarm shall be activated and transmit an alarm signal to the remote monitoring.

      Note: The shutdown of electrical equipment will be optional based on requirements of the Client/IT Department or applicable standards

2. Activation of a second smoke detector or heat detector or manual call point shall:
   a. Transmit an alarm signal to remote monitoring.
   b. Initiate a general alarm/evacuation

4.3.2 Interface Units / Control-Monitor Modules

a. The interface unit shall be an addressable device which plugs in to a pre wired wall mounting box. It shall monitor the status of an external voltage free contact.

b. The interface units are to be suitable for connection to an external contact (or contacts) by means of a pair of wires. The wires between the interface and the contact are to be monitored for short circuit and open circuit. The interface unit must be able to report to the panel whether the contact is open or closed, and whether the wiring is in normal, open or short circuit state.

c. In addition, interface units must report the type of contact being monitored i.e. Fire, Sprinkler, Auxiliary, etc.

d. Interface units are to be mounted in a moulded plastic box, size 115 x 115 mm, and are to be suitable for surface or semi flush mounting.

e. A Light Emitting Diode (LED) must illuminate when an interface unit is in alarm.

f. Removal of an interface unit shall not cause disconnection of the wiring and shall not interfere with the remaining devices on the line.

g. Each module shall be distinctly marked according to its interlinked function with regards to the firefighting / fire alarm system.

4.3.3 Connection to NFA Monitoring Equipment

Provide a connection from the Fire Alarm Panel (or FAP) to the Local Fire Authority monitoring equipment in accordance with National Fire Authority (NFA) requirements.

4.3.4 Aspiration Early Smoke Detection System

An approved Aspiration Early Smoke Detection System complying with NZS 4512 & AS1603 Part 4 for the Facility server room and/or other areas. All necessary installation shall be carried out to the highest standard and in compliance to NFA requirements.

Tender Issue

The air sampling pipes shall be coordinated with the fire detectors to ensure that there is sufficient clearance to mount the detector, noting the location of air sampling pipes and cable entry points.
Installation shall be provided for sufficient movement in all pipe work (air inlet, air exhaust and cable pipes) to allow pipe ends to be easily fitted and removed.

4.3.5 Fire Suppression System

The design, equipment, installation, testing, and maintenance of the Fire Suppression System shall be in accordance with the applicable requirements set forth in the latest edition of the following codes and standards:

1. National Fire Protection Agency (NFPA) 2001 – Clean Agent Fire Extinguishing Systems
2. NFPA 70 – National Electrical Code
3. NFPA 72 – National Fire Alarm and Signalling Code
4. FM – Factory Mutual Approval Guide
5. Underwriters Laboratories (UL) listings
6. Requirements of the Authority Having Jurisdiction (AHJ)

4.3.6 Fire Detection and Signaling Equipment

This section specifies the Fire Detection Equipment such as Smoke Detectors, Heat Detectors, Strobe Light and Strobe with Alarm Sounders and Manual Call Points.

4.3.6.1 Heat (Thermal) Detectors

The heat detectors shall be addressable type and temperature range to comply fully with NZS4512. The heat detectors shall contain an LED to indicate operating status. The circuit board on the detector shall be conformably coated to prevent moisture ingress and dust ingress. The detector shall be fully compatible with the FAP.

Heat Detectors shall be Rate-of-Rise type or with Fixed-Temperature type.

4.3.6.2 Smoke Detectors

The smoke detectors shall be addressable type and comply with UL (Underwriters Laboratory) Specifications, NZS4512 and NZS4514. The smoke detectors shall be of the photoelectric-type. The detector shall be equipped with an LED that gives a status indication for the detector. The detector circuitry shall perform a self-checking operation at regular intervals. The circuitry of the detector shall be conformably coated. The detector shall be fully compatible with the FAP.

4.3.6.3 Beam Smoke Detector

The beam smoke detectors shall be installed in accordance with the installation instruction guide provided; complying with AS/NZS 4512.

Tender Issue

4.3.6.4 Manual Call Points

The manual call point (MCP) shall be fully compatible with NZS4512 and for connection to the FAP.

The MCP shall be at least 100 mm square x 80 mm deep suitable for both surface and flush mounting.

The MCP shall be constructed of PVC or polycarbonate body, red in colour and shall incorporate a safety access break glass or replaceable removable clear plastic insert type frontage.

The alarm switch rating shall be 250V/2A.

4.3.6.5 Strobes with Sounder

All alarm alerting devices shall comply with NZS4512. Alarm alerting devices shall be compatible for connection with the FAP. All alerting devices shall be rated for 1 hour of continuous use and for (+,-) 20% of nominal battery voltage. Alerting devices shall be labelled NZS4512 Section 218 and be colour coded to shade 537 of NZS7702.

The alarm Sounder shall be capable of producing sound level not less than 65 dB L_{AFmax} and not more than 100 dB L_{AFmax} measured 1.8 meters above the floor of the room. Sound pressure levels (SPL) shall be measure when doors are closed.

4.3.6.6 Fire Emergency Evacuation Speaker

These shall be weather-resistant loudspeakers with highly intelligible voice and signal transmission for medium-power indoor and outdoor fire alarm, mass notification, and security applications. They shall be suitable for installation on supervised circuits. All equipment and installations shall be compliant with the AS 1670 and other relevant codes.

Verbal evacuation messages shall be either digitally stored, recorded or for a speaker to read-our prepared speech. The message must be clear and intelligible without heavy accent. The common intelligibility index scale (CIS) of the messages shall be equal or greater than 0.7 as required in AS 60849.

4.3.6.7 Fire Alarm Speaker Strobes

All alarm alerting devices shall comply with NZS4512:2010.

Alarm alerting devices shall be compatible for connection with the FAP.

All alerting devices shall be rated for 1 hour of continuous use and for (+,-) 20% of nominal battery voltage.

Alerting devices shall be labelled NZS4512.218.4 and be colour coded to shade no. 537.

Tender Issue

The speaker strobe shall be capable of operating at 25.0 or 70.7 Nominal Vrms selected via rotary switch, and shall have a frequency range of 400 to 4000Hz. The speaker shall have power taps that are selected by rotary switch.

The strobe light shall comply with NFPA 72 requirements for visible signalling appliances, flashing at 1Hz over the strobe's entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system.

4.3.7 Fire Detection / Fire Alarm Cables and Wiring

A. Unless otherwise specified, all detection cable loops, communication wiring and power supply cables shall comply with AS 1670.1 – Appendix B, BS 6387, category CWZ and shall be listed by the LPCB or the relevant IEC standard or other standards acceptable to local Fire Authority.

B. All detection cable loops shall be designed based on 4-wire close loop configuration and shall be housed in separate conduit / trunking in order to optimize communications integrity. No single detection loop circuit shall cover an aggregate floor area greater than 10,000m2 (AFA protected area).

   The detection cable loops shall be of solid or stranded copper cables and the nominal cross-sectional area of each conductor shall be not less than 1.5mm2. The detection cable loops shall be compatible with the type of FAP. Twisted pair cables shall be used if required by the selected FAP's panel's specification limits.

C. Unless otherwise specified, all 24-volt D.C. power supply cables used for the interconnection of fire alarm sounders, strobes, audio / visual notification appliances and control modules shall be of solid or stranded copper cables and the nominal cross-sectional area of each conductor shall be not less than 1.5mm2. The 24-volt D.C. power supply cables shall be wired in four wires ring loop circuits so that a short circuit or disconnection or circuit fault at a single point in the wiring shall not result in loss of power supply to other points. Each circuit shall be protected by a fuse or similar device.

   The 24-volt D.C. power supply cables shall be supervised and monitored with buzzer alarm at the FAP. A fault warning signal for each power supply circuit shall be generated at the FAP when any device / wiring is disconnected.

D. Fire resistance ratings of cables/wiring, ducts and conduits shall be per NZS 4512 and AS-NZS 3000.

4.3.8 Fire Extinguishers

All fire extinguishers supplied shall comply fully with NZS4503:2005. All extinguishers shall be supplied complete with 250 x 400 x 3 mm thick signage boards.

All markings and signage for fire extinguishers shall comply with AS/NZS 1841.

4.3.8.1 Multi-Purpose Dry Chemical Powder Extinguishers

The multi-purpose type, ABE portable extinguishers shall contain a charge of 4.5 kg or as indicated in the drawings.

Tender Issue

The extinguisher shall be constructed of mild steel with powder coated finish to AS/NZS 1841.5 with brass head, mild steel handle and wall brackets.

The fire extinguisher shall be rated at 1350 kPa working pressure with discharge time of around 20 seconds and 60 seconds respectively.

4.3.8.2 Carbon Dioxide Extinguishers

The carbon dioxide-type portable extinguishers shall contain a charge of 5 kg or a 50kg-wheeled type (Main Electrical Rooms) or as indicated in the drawings.

The cylinder shall be constructed of mild steel with powder coated finish to AS/NZS 1841.6 with brass head, mild steel handle and wall brackets.

An approved discharge horn shall be of electrically non-conductive material. The discharge hose shall be flexible and have a minimum working pressure of 15.5 MPa complying with AS 3791.

4.3.9 Fire Blanket

The fire blankets shall fully comply with AS/NZ 3504:1995.

All fire blankets supplied shall have the following requirements; flexibility, heat and Fire resistance. Dimensions shall be 1.0m x 1.0m for light use, and 1.2m x 1.8m for commercial kitchen use or as indicated in the drawings.

4.3.10 ACCEPTABLE MANUFACTURERS AND MATERIALS LIST

EQUIPMENT/ MATERIAL	MANUFACTURER	COUNTRY OF ORIGIN
FR Cables	Belden	USA
	Fire Sense	Australia
	Nexans	Australia
FDAS	Tyco - Vigilant	Australia/ New Zealand
	Wormald	Australia
	Edwards Fire	Australia

Tender Issue

4.4 TESTING, COMMISSIONING AND CERTIFICATION

4.4.1 FIRE DETECTION AND FIRE ALARM SERVICES & WARNING SYSTEMS

The Contractor shall upon completion of works test all components of the system as per PART 5 of NZS4512.

The systems shall be operated for the following system performance tests:

1. Tests shall comply with IEE's Regulations, local authorities' requirement, AS-NZS 3000 Electrical installations "Wiring rules" and NZS 4512.

2. Every Manual Call Point break glass unit shall be tested by loosening the glass cover and pushing the test button.

3. The Contractor shall allow for one unit in each phase for testing by breaking the glass at the discretion of the Engineer.

4. Approved type/ listed aerosol shall be used to test the response of the smoke detectors by spraying it on the detector head two feet away and/or as per fire detector manufacturer's recommendations. Chlorofluorocarbons (CFCs) spray type tester is prohibited.

5. Heat detectors shall be tested by using a fire detector manufacturer's recommended tester equipment (and/or approved equal). No open-fire equipment shall be allowed.

6. Fire alarm sounders/speakers shall be adjusted and tested such that every corner of the building shall be suitably notified by the fire alarm system.

7. If applicable, other alarm functions and control functions (e.g. AHU/Supply Air shut-off, Exhaust fan turn-on, fuel trip in the emergency generator room, or LPG supply shut-off, etc.) are in fire alert and shall be tested to satisfy the provisions of the requirements of the overall "Fire Detection and Fire Alarm System".

8. Emergency voice evacuation messages (both manual and recorded) shall be subject to intelligibility test as required by Code.

9. Warning & Emergency inter-communication equipment (speakers, hand-sets, phone-jacks and fire phone cabinets, etc.) shall be performance tested.

10. As the DC circuitry of the fire alarm system is fully-monitored, simulation tests shall be performed for all possible fault conditions.

11. Battery charger tests, battery inspections and the like shall be performed.

The Contractor shall be responsible for arranging NFA inspections before, during and upon completion of works.

The system shall be inspected as tested as specified in NZS4512. Certificate of Compliance, as per Appendix C of NZS4512, shall be completed and signed by both the Contractor and the NFA upon successful testing and commissioning of these works.

Tender Issue

The Contractor shall carry out regular inspections and testing during the defects liability period and this works shall be carried out as per PART 6 of NZS4512.

Tender Issue

4.4.2 Performance Data Sheets

A. Fire Detection and Fire Alarm Systems

Fire Services Test Report File No. _____

Client: _____ Subcontractor: _____

Project: _____ Sub contractors P.O No. _____

Location: _____ Test Apparatus / Instruments: _____

Building Reference: _____

Items	Description	Installed / Tested		Installation Quality Checks	Yes	No
		Yes	No			
1	Fire Hose Reel			Are the fire extinguishers per specs?		
				Are the fire extinguishers tags provided?		
2	Fire Alarm Panel			Are the Fire Hose Reels operating properly?		
				Is the Fire Alarm System connected to the main Fire Alarm		
3	Smoke Detector			Panel?		
				Fire Hose Reel water pressure/flow tested?		
4	Heat detector			Fire Alarm Panel Tests & connection to the		
				local fire authority?		
5	Fire Extinguisher			Fire Hydrant System		
6	Manual Call Point					
7	Fire Blankets					
8	Strobe and Sounder					
9	Carryout continuity test for wiring					
10	Fire Hydrant System					

REMARKS:

Accepted for Temo Consulting Ltd	Accepted for Contractor	Accepted for Client
Name: _____	Name: _____	Name: _____
Signature: _____	Signature: _____	Signature: _____
Date: _____	Date: _____	Date: _____

NOTE:
Contractor to submirtalong with this form a properly filled standard Acceptance Test Procedure (ATP)

Tender Issue

4.5 MAINTENANCE (DEFECTS & LIABILITY PERIOD)

4.5.1 GENERAL

Maintain the work for a period terminating 12 months from the date of Practical Completion of the whole of the Contract Works, replacing or repairing any faulty equipment or materials, or the results of incompetent workmanship, free of charge.

4.5.2 SCOPE OF WORKS

a) Routine maintenance and servicing is to be carried out on a monthly basis for a period of 12 months from the date of Practical Completion to the end of the Maintenance and Defects & Liability Period (DLP) without cost to the Owner.

b) Monthly maintenance and servicing in accordance with maintenance schedules recommended by equipment manufacturers.

c) Maintenance, testing and inspections in accordance with regulatory requirements and relevant New Zealand standards.

d) Rectification of defects at Providers cost.

e) Replacement of consumables at Providers cost.

f) Provision and filling out logbook which must on site detailing all visits.

g) Service personnel to be available for call out on a 24-hour per day, 7-day per week basis. Response time for emergency and corrective maintenance must not exceed 2 hours.

4.6 SCHEDULE OF MAINTENANCE CONTRACT

The contractor shall provide a price to carry out preventative maintenance of all systems installed on the expiry of the Defects & Liability Period (DLP). A brief summary of the minimum maintenance scope follows;

4.6.1 GENERAL

a. The provision of skilled personnel fully conversant with the plant and equipment and competent to attend the same shall be included.
b. Attendance upon the plant and equipment for the purpose of routine cleaning and inspection at specified intervals shall be included.
c. All periodic maintenance services requiring system shutdown shall only be carried out after the normal operating hours and with authorization from the Employer's representative. The frequency of maintenance shall be as per Schedule of Maintenance Works of this Specification.
d. All replacement of parts and components shall be included in the comprehensive Maintenance Contract.

4.6.2 FIRE ALARM SYSTEM MONTHLY CHECKS AND TESTS

a. The float voltage across any rechargeable battery shall be checked to ensure that the voltage per cell is maintained within the 2.20 ± 0.03 V per cell limits, unless different voltages are specified by the battery manufacturer.

Tender Issue

b. The battery cabinet and terminals shall be checked to ensure they are maintained in a clean serviceable condition.
c. Correct operation of the system, including all indicators, shall be tested by using the test facilities in zone circuits with the system in the test or isolate mode. The system shall be reset to normal after completion of the test.
d. Test the alerting devices to ascertain they operate satisfactorily, as witnessed from the control unit.
e. Where connected to a remote receiving centre, and with the system in the appropriate test mode, a test of the device for signalling shall be made to ensure that the correct signals are generated and received.
f. The battery shall be tested for 10s at not less than the 5h discharge rate. During this test the battery voltage shall not fall below 80% of its nominal voltage. The battery under test shall not receive any assistance from any other power source.
g. A test report shall be completed and the results entered in the system logbook. The report shall be copied, on request, to the owner and to any authority or agency required to receive one.

4.6.3 FIRE ALARM SYSTEM ANNUAL CHECKS AND TESTS

a. The warning facilities shall be checked to ensure they are operating correctly for the following conditions:
- Failure or disconnection of the battery
- Failure or disconnection of the leads to a detector or manual call point
- Absence of any plug-in zone circuit board

b. The operation of all manual call points shall be tested in situ.
c. Automatic fire detectors shall be tested.
d. The operation of each zone circuit from either the end of line device, or most remote detector or manual call point, to the output of the control unit signalling device shall be checked.
e. A through visual examination shall be made of the general condition of all components of the system.
f. All aspirating system pipe work shall be cleaned using alternating vacuum or positive pressure to remove internal dust build-up. All aspirating smoke detector filters shall be cleaned or replaced as per manufactures instruction.
g. The entire premises shall be checked to ensure that all areas are protected and that any building alterations, or changes in usage of any area, have not reduced the effectiveness of the system.
h. Indicators and legends shall be checked to ensure that they are still current and that they clearly indicate their function at a viewing distance of 2m.
i. The interface shall be checked between the fire alarm system and any ancillary service forming part of the building's fire safety system (such as smoke control system, lift override, etc.).
j. A test report shall be completed which records the result of all tests and inspections together with a list of non-complying features and corrective measures necessary to return the system to compliance with this standard. The report shall be copied to the owner, with a copy lodges as required by any compliance schedule issued in respect of the Building Act.

Tender Issue

5 DOCUMENTATION AND DRAWINGS

Documentation and drawings shall be provided for as follows:-

5.1 GENERAL

Drawings and documents for approval by the client's representative and the local authority, shall be provided for at the stages as indicated and work shall not proceed with the next stage until the drawings, documents and samples have been approved and the various actions have been taken as required.

5.2 TENDER STAGE

Submit at the time of tender the completed price, rate prices and deviations schedules, draft quality control plan as well as a tender letter with any deviations.

5.3 TENDER AWARD STAGE

Within three weeks of tender award, issue 3 sets of paper copies of the shop drawings detailing the extent of the installation.

The shop drawings shall be drawn with AutoCAD ver. 2015 minimum or later versions to a 1:100 scale in general and 1:50 scale for plant and equipment layouts.

5.4 CONSTRUCTION STAGE

The Q/A plan shall be updated and signed off as and when required.

5.5 HAND OVER STAGE

5.5.1 As-Built Drawings

Issue 3 sets of 1:100 paper copies and a CD with the electronic version of the as built drawings.

The as built drawings shall show the actual commissioned flow rates and equipment details and capacities.

A draft of the As Built documents shall be provided to the Engineer four weeks prior to Practical Completion for approval. Provision and acceptance of final as-built, commissioning, and maintenance documentation shall be a prerequisite for Practical Completion.

'As Built' drawings, to the approval of the Engineer shall be provided for the Contract Work. These shall be in similar detail to the installation drawings, but shall also include

Tender Issue

any amendments and any additional detail necessary to show the functioning or installation, or particular items of plant.

The approval of any drawings by the Engineer in no way affects the Mechanical Services Subcontractor's responsibility for the satisfactory completion of the Contract.

Acceptance of these drawings shall be required as a pre-requisite for Contract Completion.

All costs incurred for correction or alteration work due to failure of the Contractor to seek approval, or error in late submission of information supplied by the Contractor shall be to the Contractor's account.

5.5.2 Operation and Maintenance Manuals

Provide Operation and Maintenance Manuals as specified in General Conditions clause 3.43

Tender Issue

6 PRICE SCHEDULES

The tenderer shall complete the pages of the section and forward a completed copy to the client's representative together with their tender letter.

6.1 TENDER PRICE

..…… (Tenderer's company name)

…… (Street address)

…… (City)

…… (Tel.)

…… (Fax.)

…… (Email)

We, as per above, tender for the installation as per this specification inclusive of the provisional sums above for the total sum of

$……..…. (VIP)

And in words ……..

……Dollars

Responsible person's first and last names ……

Signature ……

Tender Issue

7 RATE PRICES, MARGINS AND SUBCONTRACTORS

The rate prices below are for the purpose of calculating variation to the contract in addition to the work in this specification: The prices shown and the percentages shall include all the margins, P & G's as a selling price to the client and shall also be applicable to all subcontractors.

Hourly charges:-

Installation technician weekdays	…… $/hour excl VAT normal time from 7h00 to 17h00
Commissioning weekdays	…… $/hour excl VAT normal time from 7h00 to 17h00
Electrician weekdays	…… $/hour excl VAT normal time from 7h00 to 17h00
Engineer weekdays	…… $/hour excl VAT normal time from 7h00 to 17h00
Overtime	…… % additional to normal time.
Travelling charges	…… $/per round trip excl VAT to site

7.1 MARGINS' PERCENTAGES

The margins below are for the purpose of calculating variations to this contract in addition to the work in this specification: The prices shown and the percentages shall include all the margins, P & G's as a selling price to the client and shall also be applicable to Subcontractors.

Margin on bought out equipment and materials …… % on invoice value excl VAT.

7.2 SUBCONTRACTORS

No work shall be performed by staff other than the tenderer's own staff except as nominated below – written permission shall be obtained from the client's representative prior to using any other Subcontractors than nominated below.

The tenderer shall complete the following table and name either their own company staff or a sub contracted company they intend to use for any work not performed by their own staff:

Sub contractor's company name	Work description
……..	……
……..	……
……..	……

Tender Issue

7.3 DEVIATIONS AND ALTERNATIVES

The tenderer shall complete this page and forward a completed copy to the client's representative together with his/her tender letter.

Tenderers are welcome to offer valid savings with alternative equipment satisfying the same standard to those scheduled, subject to approval by the client's representative.

Tender Issue

8 TENDER PRICE BREAKDOWN:

8.1 MFMR AUKI – MALAITA PROVINCE, SOLOMON ISLANDS: Fire Services Price Summary

Item No.	Work Description	Price ($)
	FIRE DETECTION & FIRE ALARM SYSTEM	
1.	Supply and installation of detectors, manual call points, horn/speaker-strobe, monitoring & control modules, fire-door auto-openers and other ancillary devices that are connecting to the Addressable Fire Alarm Panel. Layout and locations are as indicated in the drawings.	$
2.	Supply and installation of Addressable Fire Alarm Panel, with properties according to specifications, connection links interface of existing FAP and accessories. Location is as indicated in the drawings	$
3.	To provide for future connections and expansion at the Addressable Fire Alarm Panel. These include but not limited to interface connections of component modules for the AHU, other mechanical equipment, lift homing system, emergency escape magnetic doors, other fire-fighting ancillary services, and future expansion.	$
4.	To provide fire detection and fire alarm systems fire-rated cabling, conduits & trunkings (as required) from every fire detecting, alarming and signalling devices to be connected to the Fire Alarm Panel.	$
5.	To provide fire detection and alarm systems interface connection fire-rated cabling, conduits & trunkings (as required), contacts, relays, and other necessary devices of the required interface terminals of control panels, distribution panels/boards, BMS panels (if any) and monitor/control modules of other equipment/devices to be connected to the Fire Alarm Panel.	$
	FIRE EXTINGUISHER SYSTEM	
6.	Supply and installation of Fire extinguishers, Dry Powder (ABE), 2.5kg & 4.5kg portable cylinders, signage and brackets in locations as indicated in the drawings.	$
7.	Supply and installation of Fire Extinguishers, Carbon Dioxide (CO_2), 5kg portable cylinders, signage and brackets at locations as indicated in the drawings.	$

Tender Issue

Item No.	Work Description	Price ($)
8.	Supply and installation of Fire Blankets with signage and accessories at locations as indicated in the drawings.	$
9.	To provide, facilitate, pay fees and other charges for the acquisition/completion of the Hydrant System Certification (HSC) for the project as per required in the code NZS 4510.	$
	GENERAL	
10.	Provision of all necessary scaffoldings, platforms, scissors lifts and other preliminaries.	$
11.	To provide shop drawings, material submittals, As-Built Plans, O&M Manuals, Manufacturer's Documentation and Client Instruction.	$
12.	Maintenance and attendance to faults, including labour and materials for the defects & liability period.	$
13.	To provide, facilitate and coordinate the Testing & Commissioning of Works, Local Fire Authority Inspections and Final Certification and other necessary fees and charges for the completion and certification of the Works.	$
14.	Any other items not covered in above as described below:	$
		$
	Add:	$
	Value Added Tax	$
	Total Fire Services Costs	$

Total Fixed Lump Sum Price. . . . . $_____

Amount in Words: _____

_____ Dollars

The prices to be set out in this schedule are to provide a breakdown of the tender sum and shall be inclusive of all incidentals in accordance with the specifications. This is a comprehensive supply and installation contract and the tenderer shall take all responsibility for all items required to complete the Contract Works in accordance with the Contract Documents.

Tender Issue

8.2 MAINTENANCE COST FOR FIRE SERVICES

(i) Maintenance Cost for Fire Services.

Fire Services Maintenance	Per Month ($VEP)	Per Year ($VEP)
1st Year		
2nd Year		
3rd Year		
4th Year		
5th Year		

Note: Proposed maintenance costs are for post-DLP regular checking and maintenance of the whole Fire Services system.

Tender Issue

8.3 EQUIPMENT SCHEDULE

The equipment schedules give the type, manufacture and required performance of the equipment as shown on the drawings and specification.

8.3.1 FIRE ALARM & EMERGENCY WARNING SYSTEMS

Origin of manufacturing	
FAP/Mimic Panel Brand/Model	
EWIS Panel Brand/Model	
Smoke Detector Brand/Model	
Heat Detector Brand/Model	
Fire Cabling Brand/Model	
Manual Call Point Brand/Model	
Fire Alarm Strobe Brand/Model	
Fire Alarm Speaker Brand/Model	
Fire Telephone Brand/Model	
ETA of Equipment's	
System Warranty Period	

8.3.2 FIRE HYDRANT SYSTEM

Origin of manufacturing	
Fire pump (Diesel) Brand/Model	
Fire pump (Electric) Brand/Model	
Building Hydrant Outlet Brand/Model	
Building Hydrant/Breeching Inlet Brand/Model	
Hydrant Pipe underground Brand/Model	
Hydrant Pipe aboveground Brand/Model	
ETA of Equipment's	
System Warranty Period	

8.3.3 FIRE SPRINKLER SYSTEM

Origin of manufacturing	
Fire pump (Diesel) Brand/Model	
Fire pump (Electric) Brand/Model	
Sprinkler heads Brand/Model	
Sprinkler flow switch Brand/Model	
Sprinkler supervisory valves Brand/Model	
Fire Sprinkler/ Breeching Inlet	

Tender Issue

Brand/Model	
Sprinkler Pipe underground Brand/Model	
Sprinkler Pipe aboveground Brand/Model	
ETA of Equipment's	
System Warranty Period	

Note: Contractor to ensure that all specified equipment's are compliant with the relevant standards (AS/NZS and or NFPA).

Tender Issue

9 SCHEDULE OF UNIT RATES- FIRE SERVICES

Item No.	Description	Unit	Unit Cost
A	**Fire Detectors**		
A.1	Addressable Smoke Detectors	Ea.	$
	Photoelectric-type (optical) smoke detector		
	with Pulsing LED		
A.2	Addressable Smoke Detectors	Ea.	$
	Photoelectric-type (optical) smoke detector		
	with Pulsing LED and Sounder base		
A.3	Addressable Heat Detector	Ea.	$
	Normally Closed Operation, Self-Resetting,		
	57^0C & 77^0C with LED indicator		
B	**Fire Alarm Alerting Devices**		
B.1	Strobe with Alarm Sounder	Ea.	$
	Vector sounder, Low profile, IP42,		
	and @ 91 dB @ 1m		
B.2	Manual Call Point	Ea.	$
	Universal back box @ 250Vac, 2A,		
	NZ4512 Approved		
B.3	Addressable Fire Alarm Panel	Ea.	$
	Regular assembly, up to 32 zone capacity		
	230 Vac plus 2 x 12V SLA		
B.4	Remote Annunciator Mimic Panel	Ea.	$
	Regular assembly, up to 32 zone capacity		
	230 Vac plus 2 x 12V SLA		
C	**Fire Alarm Cables & General Wiring**		
C.1	1 pair 1.0mm loop wiring (smoke/ Heat Detector circuit)	m	$
C.2	1 pair 1.5mm TPS NAC (sounder & Strobe circuit)	m	$
C.3	Junction boxes	Ea.	$
C.4	Monitoring module	Ea.	$
C.5	Control module	Ea.	$
D	**Fire Sprinklers System**		

Tender Issue

Item No.	Description	Unit	Unit Cost
D.1	Upright Fire Sprinkler heads	Ea.	$
D.2	Pendent Fire Sprinkler heads	Ea.	$
D.3	Concealed Pended Fire Sprinkler heads	Ea.	$
D.4	Side-wall Fire Sprinkler head	Ea.	$
D.5	Fire Sprinkler head cage	Ea.	$
D.6	Galvanised/ Black Iron Pipe		
D.6.1	Ø 25 mm	m.	$
D.6.2	Ø 32 mm	m.	$
D.6.3	Ø 40 mm	m.	$
D.6.4	Ø 50 mm	m.	$
D.6.5	Ø 80 mm	m.	$
D.6.6	Ø 100 mm	m.	$
D.6.7	Ø 150 mm	m.	$
D.7	Galvanised/ Black Iron Pipe fittings (Elbows)		
D.7.1	Ø 25 mm	Ea.	$
D.7.2	Ø 32 mm	Ea.	$
D.7.3	Ø 40 mm	Ea.	$
D.7.4	Ø 50 mm	Ea.	$
D.7.5	Ø 80 mm	Ea.	$
D.7.6	Ø 100 mm	Ea.	$
D.7.7	Ø 150 mm	Ea.	$
D.8	Galvanised/ Black Iron Pipe fittings (Tees)		
D.8.1	Ø 25 mm	Ea.	$
D.8.2	Ø 32 mm	Ea.	$
D.8.3	Ø 40 mm	Ea.	$
D.8.4	Ø 50 mm	Ea.	$
D.8.5	Ø 80 mm	Ea.	$
D.8.6	Ø 100 mm	Ea.	$
D.8.7	Ø 150 mm	Ea.	$
D.9	Flow Switches with fixing, wirings and connections	Ea.	$
D.10	Supervisory Switch Valves with wirings and connections	Ea.	$
D.11	Ø 150 mm Monitored isolation valves & connections	Ea.	$
D.12	Ø 100 mm Monitored isolation valves & connections	Ea.	$
D.13	Ø 80 mm Monitored isolation valves & connections	Ea.	$
E	**Fire Extinguishers**		

Tender Issue

Item No.	Description	Unit	Unit Cost
E.1	Multi-purpose type ABE 4.5 kg @ 1350 kPa, complying AS/NZS 1841.5 with brass head, mild steel handle and wall brackets.	Ea.	$
E.2	Multi-Purpose type ABC, 50kg complying with AS/NZS 1841.6, wheeled-type	Ea.	$
E.3	Carbon Dioxide, 6.8kg complying with AS/NZS 1841.6, portable cylinder with horn, hoses and wall brackets.	Ea.	$
E.4	Carbon Dioxide, 50kg complying with AS/NZS 1841.6, wheeled-type	Ea.	$
F	**Fire Hose Reels & Hose**		
F.1	Swinging manual fire hose reel with cabinet, std. length 36 x 19mm nom. dia. fire hose tubing with spray jet nozzle.	Lot	$
F.2	Ø 65 mm x 30 m Fire Hose of layflat-type high-grade polyester with PVC lining c/w stainless steel fire hose box.	Lot	$

Tender Issue