Client	**:**	**NRF/SARAO**
Project	**:**	**SARAO Artisan Training Centre**
Type	**:**	**Scope of Works**

ARTISAN TRAINING CENTRE
HIGH LEVEL SCOPE OF WORKS

Document number SSA17-G1-00A-ALL-PLN-002

Revision 1

Classification ..... Company Confidential

Date ..... 22 June 2020

DOCUMENT APPROVAL

	Name	Designation	Affiliation	Date & Signature
Prepared by	R. Young	Functional Manager System Engineering	SARAO	23/06/2020
Reviewed by	C. Smith	Functional Manager Electrical Engineering	SARAO	26/06/2020
Reviewed by	B. Wallace	Data specialist	SARAO	Bruce Wallace (Jun 29, 2020 08:20 GMT+2) 29/06/2020
Accepted by	K. de Boer	Head: Human Capacity Development	SARAO	Kim de Boer (Jun 29, 2020 09:01 GMT+2) 29/06/2020
Approved by	R. Daka	Project Manager	SARAO	Rosalynn Daka (Jun 29, 2020 12:24 GMT+2) 29/06/2020
Approved by	A. Brand	Program Manager	SARAO	AD Brand (Jun 29, 2020 12:38 GMT+2) 29/06/2020
Approved by	J. Jonas	Project Sponsor	SARAO	Justin Jonas (Jun 29, 2020 12:42 GMT+2) 29/06/2020

DOCUMENT HISTORY

Revision	Date Of Issue	ECN Number	Comments
A	12 September 2019	N/A	Initial draft for review
B	1 May 2020	N/A	Updated after review comments
C	17 June 2020	N/A	Final review version
1	22 June 2020	N/A	Approved for use

DOCUMENT SOFTWARE

	Package	Version	Filename
Word Processor	MsWord	Word 2016	SSA17-G1-00A-ALL-PLN-002 Rev1 ATC High Level Scope Of Works

COMPANY DETAILS

Name	**SARAO Offices**		
Physical /Postal Address	2 Fir Street, Black River Park, Observatory Cape Town South Africa 7925	Corner of Victoria and Hanau Street Carnarvon Northern Cape 8929	17 Baker Street Rosebank Johannesburg South Africa 2132
Tel.	.+27 (0)21 506 7300	.+27 (0)53 382 5000	+27 (0)11 268 3400
Website	www.ska.ac.za		

TABLE OF CONTENTS

TABLE OF FIGURES

1 INTRODUCTION

The South African Radio Astronomy Observatory (SARAO) will construct an Artisan Training Centre and upgrade the existing building at their Masolkeweg premises in the town of Carnarvon.

The new training centre building will consist of a double volume Workshop & Trade Test Area, approximately 6m high overall, with a single story administration and ablution area at one end. The overall floor plan is to be approximately 636m².

There is an existing building (formally a dwelling) on the premises of approximately 175m² in area. This building is to be renovated and converted into student accommodation which is to include converting the existing garage and domestic quarters into bedrooms with en-suite bathrooms.

An existing prefabricated, portable single story structure (park home) to be used for educational purposes will be relocated from Klerefontein and sited on a concrete plinth at the Masolkeweg premises.

The renovations shall include upgrades to the boundary walls and fences, access and parking as well as water supply and sewerage systems.

This scope of works defines in varying levels of detail, the activities, supplies and baseline design for the project.

2 APPLICABLE DOCUMENTS

The following documents are applicable to the extent stated herein. In the event of conflict between the contents of the applicable documents and this document, the applicable documents shall take precedence.

[RD1] National Building Regulations and Building Standards Act No. 103 of 1977 (as amended)

[RD2] SANS 10400 (All Parts):2011, The application of the National Building Regulations (Including SANS 204)

[RD3] Model Preambles for Trades 2008, The Association of South African Quantity Surveyors

[RD4] Standard System of Measuring Building Work 1999 Sixth Edition (Revised), The Association of South African Quantity Surveyors.

[RD5] SANS 10142-1:2017, The wiring of premises, Part 1: Low-voltage installations

[RD6] SANS 10389-1:2003, Exterior lighting, Part 1: Artificial lighting of exterior areas for work and safety

[RD7] SANS 10114-1:2005, Interior lighting Part 1: Artificial lighting of interiors

[RD8] Occupational Health and Safety (OHS) Act, Act 85 of 1993

[RD9] Disaster Management Act 2002, Regulations issued in terms of section 27(2), as amended (https://www.gov.za/coronavirus/guidelines)

[RD10] DuraMulti DB Technical Specification - Guide for Handling and Installation of various variants, DuraMulti DB (http://www.duraline.cz)

[RD11] ITU-T G.657 (11/2016), Characteristics of a bending-loss insensitive single-mode optical fibre and cable

[RD12] SANS 164-2:2016, Plug and socket-outlet systems for household and similar purposes for use in South Africa Part 2: IEC system, 16 A 250 V a.c.

[RD13] SANS 791:2014, Unplasticized poly(vinyl chloride) (PVC-U) sewer and drain pipes and pipe fittings.

3 RESPONSIBILITIES OF THE ARCHITECT / ENGINEER

3.1 REQUIREMENTS FOR THE ARCHITECT / ENGINEER

3.1.1 The architect to be employed for these works shall be registered as a Professional Architect (Pr Arch) with the South African Council for the Architectural Profession (SACAP).

3.1.2 The engineer to be employed for these works shall be registered as a Professional Engineer (Pr Eng) with the Engineering Council of South Africa (ECSA).

3.2 SITE ASSESSMENT AND FACILITY DESIGN

3.2.1 This section provides guidance to the architect and/or engineer regarding their responsibilities.

3.2.2 SITE AND SCOPE ASSESSMENT

3.2.2.1 The architect / engineer shall review in detail this scope of works and highlight any requirements which are contrary to regulations or good practice.

3.2.2.2 The architect / engineer shall inspect the site including existing structures, and identify any issues or concerns regarding the condition of the site and its existing structures, with respect to applying the stipulated scope of works and the National Building Regulations [RD1].

3.2.2.3 The architect / engineer shall make recommendations to the client regarding the identified issues or concerns.

3.2.3 FACILITY DESIGN

3.2.3.1 The scope of works defined here is based on a preliminary reference design. The architect / engineer shall produce a detail design based on the functional requirements.

3.2.3.2 The architect / engineer shall prepare a set of architectural and construction drawings for review and acceptance by the client for the site and each individual building or infrastructure element. The designs and drawings shall be in accordance with SANS 10400 [RD2].

3.2.3.3 There shall be separate drawings for each utility installation such as electricity, plumbing and sewerage, telecommunications, HVAC, security, etc.

3.2.3.4 The drawings shall each be accompanied by a bill of materials (schedule), including methods where required.

3.2.3.5 The architect / engineer will work with the client project manager to revise the construction schedule and plan the detailed activities on site so as to minimise congestion on site and duration.

3.2.4 SITE RESPONSIBILITIES

3.2.4.1 The architect / engineer shall oversee all construction and installation activities on behalf of the client and take full responsibility for the quality of the materials supplied and ensure the work performed complies with SANS 10040 [RD2] and other related standards.

3.2.4.2 The architect / engineer shall ensure that the necessary construction facilities are present and maintained on site, such as constructor's ablutions, material and equipment stores, etc.

3.2.4.3 The architect / engineer shall ensure that municipal and neighbouring property is undamaged or returned to original condition if it is necessary to disturb such property.

3.2.4.4 The architect / engineer shall facilitate all inspections as required by municipal or other authorities.

3.2.4.5 The architect / engineer shall participate in or facilitate all inspections, tests and verification as required by the scope of work.

3.2.4.6 The architect / engineer shall be responsible for the handover / commissioning of the site.

3.2.4.7 The architect / engineer shall be responsible for the health and safety of the site while under construction.

3.2.4.8 The architect / engineer shall work with the client Safety, Health, Environment & Quality (SHEQ) representatives to ensure compliance of all site activities to the prevailing legislation and regulations regarding COVID-19 [RD9].

4 BUILDINGS AND SITEWORKS

4.1 All siteworks, construction, renovation and installations within this scope of supply shall be in accordance with SANS 10400 [RD2] and its individual parts.

4.2 All works shall comply with the engineer or design authority's specifications.

4.3 NEW WORKSHOP BUILDING

4.3.1 SUBSTRUCTURE

4.3.1.1 Foundations

4.3.1.1.1 Excavations:

4.3.1.1.1.1 Existing services - Utility services: Identify the location of underground utility services pipes and cables.

4.3.1.1.1.2 Excavation shall be accurately cut to the lines and levels shown on the drawings. The Contractor shall keep the excavation free from water by means of pumping, bailing, or other suitable means.

4.3.1.1.1.3 Excavated and stripped ground surface: After excavation and/or stripping, compact these surfaces to a minimum depth of 150mm as per engineers recommendation.

4.3.1.1.2 Footings:

4.3.1.1.2.1 Excavate for footings to the required sizes and depths. Confirm that the foundation conditions meet the design bearing capacity.

4.3.1.2 Ground Floor Construction

4.3.1.2.1 Minimum 100mm thick, mesh reinforced concrete surface beds:

4.3.1.2.1.1 25MPa/19mm concrete.

4.3.1.2.1.2 Fabric reinforcement Ref. 395 (Cover to top 30mm).

4.3.1.2.1.3 One layer of 250 micron "Plastall Gundle USB Green" waterproof sheeting sealed at laps with "Gunplas Pressure Sensitive Tape".

4.3.1.2.1.4 Concrete channels in the workshop area.

4.3.1.2.1.5 110mm concrete slab thickening.

4.3.1.2.2 Minimum 25mm screed on floors and landings:

4.3.1.2.2.1 1:3 Cement plaster screeds steel trowelled on concrete.

4.3.1.3 Floors

4.3.1.3.1 Internal Finishes:

4.3.1.3.1.1 Epoxy coating system (colour: semi-gloss water based) – Preparatory work and application in accordance with the supplier's instructions.

4.3.1.3.1.2 Ceramic floor tiles in the toilets, kitchen, strongroom and all offices (admin office and 2 x offices in the workshop area.

4.3.1.3.1.3 40mm Granolithic finish to the Workshop Area.

4.3.1.3.1.4 75mm tile skirting on walls.

4.3.1.3.2 External Finishes:

4.3.1.3.2.1 40mm Granolithic finish to the Veranda.

4.3.2 SUPERSTRUCTURE

4.3.2.1 Walls

4.3.2.1.1 Brickwork: Brickwork of NFP 14MPa bricks in class II mortar.

4.3.2.1.1.1 220mm external walls and around the strongroom.

4.3.2.1.1.2 110mm internal brick walls.

4.3.2.2 Internal Finishes

4.3.2.2.1 Plaster to walls:

4.3.2.2.1.1 Cement plaster (1:5) on brickwork and concrete wall to a smooth finish throughout the administrative area, including offices, kitchen and bathroom areas.

4.3.2.2.2 Paint to walls:

4.3.2.2.2.1 One coat alkali resistant primer and two coats of acrylic emulsion paint on the plaster walls.

4.3.2.2.3 Wall Tiles:

4.3.2.2.3.1 All bathrooms and kitchen areas to be tiled to 1 500mm high.

4.3.2.2.3.2 Allow the prime cost amount of R100.00 (One hundred rand and nil cents) net per square metre excluding VAT for supply only of ceramic wall tiles.

4.3.2.3 External Finishes

4.3.2.3.1 Brickwork

4.3.2.3.1.1 Face Brickwork of NFP 14MPa bricks in class II mortar. – Corobrik.

4.3.2.4 Ceiling

4.3.2.4.1 Concrete interior roofing / ceiling

4.3.2.4.1.1 110mm 25MPa/19mm Concrete roof for the strong room.

4.3.2.4.1.2 110mm 25MPa/19mm Concrete roof for the workshop store area.

4.3.2.4.2 Nailed up ceilings:

4.3.2.4.2.1 The kitchen and bathroom areas, admin building, and the two offices in the workshop area shall have ceilings.

4.3.2.4.2.2 Ceiling Grid exposed face 24mm tee suspended ceiling grid system.

4.3.2.4.2.3 Main tee's spaced and supported at 1 200mm and cross tee's spaced at 600mm (1 200x600 system).

4.3.2.4.2.4 Ceiling tee's to be white capped.

4.3.2.4.2.5 Installation in accordance with guidelines and laid on top of brandering between roof timbers, all manufacturing processes shall be completed.

4.3.2.4.3 Finishes:

4.3.2.4.3.1 Cement plaster (1:5) on soffits of slab to a smooth finish.

4.3.2.4.3.2 One coat alkali resistant primer and two coats of acrylic emulsion paint on soffits of slab.

4.3.2.5 Roof Covering

4.3.2.5.1 Pitched roof with gable or bullnose ends with profiled metal sheeting and accessories.

4.3.2.5.1.1 Main Workshop Building: HDG Steel trusses for 15m x 23m x 3,75m high structure with 0,5 Chromadek IBR C1S roof sheeting.

4.3.2.5.1.2 4,7m x 1,2m Polycarbonate IBR sheet per bay on roof, roof covering to steel trusses at approximately 300mm centre.

4.3.2.5.1.3 HDG Steel trusses for 10m x 10m x 3,75m high structure with 0,5 Chromadek IBR C1S roof sheeting (admin building).

4.3.2.5.2 Lean-to roof

4.3.2.5.2.1 8m x 7m x 3,0m/3,75m Lean-to structure along the western 23m workshop side only at approximately 3,5m centres to pitch not exceeding 5 degrees.

4.3.2.5.3 A five years guarantee shall be issued for site workmanship and water tightness.

4.3.2.6 Roof insulation:

4.3.2.6.1 Super Sisalation: FR405 Fibre radiant aluminium foil insulation fixed to top of trusses to manufacturers' specifications.

4.3.2.6.2 Insulation material to be laid over trusses and stapled to it before fixing purlins.

4.3.2.6.3 135mm thick layer Aerolite insulation on ceiling between trusses.

4.3.2.6.4 Exclude polycarbonate sheeting areas for natural lighting.

4.3.2.7 Venting and Extraction

4.3.2.7.1 Passive roof-mounted extraction fans (“tornado type”) are to be mounted on the roof.

4.3.2.7.2 Quantity and spacing as per recommendation from engineer and manufacturer.

4.3.2.8 Doors

4.3.2.8.1 Doors:

4.3.2.8.1.1 External: AAMSA brown anodized aluminium doors, 1 720mm x 2 260mm.

4.3.2.8.1.2 External: Galvanized pressed steel 3 000 x 3 000mm chain operated roller shutter doors.

4.3.2.8.1.3 External: Paraplegic Timber door & Frame, 1 000mm x 2 032mm.

4.3.2.8.1.4 Internal: 40mm hollow core flush doors, 813mm x 2 032mm with 3,2mm standard hardboard covering on both sides.

4.3.2.8.1.5 Internal: Steel strong room door, 830mm x 1 932mm of 104mm thickness.

4.3.2.8.2 Frames:

4.3.2.8.2.1 Single door internal (813mm x 2 032mm): Galvanized pressed steel 1,6mm double rebated frames suitable for one brick wall.

4.3.2.8.3 Finishes: Refer to Paintwork Trade in the detailed pricing schedule.

4.3.2.9 Ironmongery

4.3.2.9.1 Cupboards shall be fitted with all necessary hinges, handles, catches, etc.

4.3.2.9.2 Cupboards shall be securely fixed with all necessary screws and fibre, plastic or metal plugs. (Dorma/ Union).

4.3.2.9.3 Screws, bolts, etc. for fixing of ironmongery shall be of matching metal and finish, except for aluminium ironmongery or ironmongery fixed to aluminium in which cases stainless steel screws may be used.

4.3.2.9.4 Finishes: Refer to Paintwork Trade in the detailed pricing schedule.

4.3.2.10 Windows

4.3.2.10.1 All aluminium windows to be AAMSA approved brown anodized

4.3.2.10.2 Supply of aluminium windows shall include glass and fixing in position.

4.3.2.10.3 All aluminium windows shall be sealed and protected against damage, deterioration or discolouration by taping with removable tape or covering with temporary casings or motor oil and removing same on completion.

4.3.2.10.4 Glazing

4.3.2.10.4.1 Any material used in the glazing of any building shall be of a secure and durable type and shall be fixed in a manner and position that will ensure that it will safely sustain any wind actions which can reasonably be expected; not allow penetration of water to the interior of the building and be apparent, in the case of clear glazing, to any person approaching such glazing.

4.3.2.10.4.2 Glazing of windows to be done according to the National Building Regulations– Part N [RD1][RD2].

4.3.2.11 Plumbing and Drainage

4.3.2.11.1 Toilet (WC)

4.3.2.11.1.1 Supply and install qty 6 (2 admin, 3 learners and 1 disabled bathroom) WCs.

4.3.2.11.1.2 Semi-close coupled 90° outlet, free standing WC suite comprising pan with "P' or "S' trap, 9 litre cistern complete with lid, fitments, flush pipe elbow, ball valve, and heavy duty double flap 'white' plastic seat.

4.3.2.11.1.3 Wall-mounted toilet paper dispenser.

4.3.2.11.1.4 Qty 1: 40mm x 400mm Stainless steel safety grab bar rail, Safety oblique bar rails as appropriate for the disabled persons' bathroom.

4.3.2.11.2 Urinal

4.3.2.11.2.1 Supply and install qty 1 (learners bathroom) urinal.

4.3.2.11.2.2 Wall mounted, top Inlet, complete with spreader, flusher, pipes, CP domical grating, brackets, CP bottle trap.

4.3.2.11.3 Wash Hand Basin (WHB)

4.3.2.11.3.1 Supply and install qty 5 (2 admin, 2 learner, 1 disabled bathroom) WHB.

4.3.2.11.3.2 Wall mount or "drop-in" as per architect / engineer recommendation. WHB size approx. 510 x 400mm.

4.3.2.11.3.3 All WHB to be supplied and fitted with CP taps (single per WHB), ball valves, piping and traps.

4.3.2.11.3.4 The WHB fittings for the disabled bathroom to be of medical facility type.

4.3.2.11.3.5 Wall-mounted Soap Dispenser Stainless Steel Liquid Soap Box - 800ml.

4.3.2.11.4 Mirrors:

4.3.2.11.4.1 Supply and install qty 5 (2 admin, 2 learners, 1 disabled bathroom) mirrors

4.3.2.11.4.2 Mirrors to be 776mm x 776mm, 3mm thick silvered float glass copper backed mirrors with polished edges, holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork.

4.3.2.11.5 Supply and install a single 15 litre under counter geyser in each (2) kitchenettes.

4.3.2.11.6 Supply and install a single 7.5 litre in-line over-counter "hydroboil" water heater in the learners' kitchenette.

4.3.2.11.7 Supply and install Kitchen Sink: Qty 2 (one per kitchenette)

4.3.2.11.7.1 Single stainless steel "drop in" sink with draining plate, complete with plugs, fittings, waste piping and traps.

4.3.2.11.7.2 Sink mixer: CP, complete with CP ball valves and flexible connection pipes for hot and cold supply.

4.3.2.11.7.3 Supply and install qty 2 (1 per kitchen) kitchen cabinet with sink cut-out and under counter doors.

4.3.2.11.8 Supply and install 30m fire hose on reel, to be mounted at location designated by SARAO.

4.3.2.12 Sundries

4.3.2.12.1 Supply and install the following:

4.3.2.12.1.1 Qty 2: 4 000 x 600mm Wooden fully furnished kitchenette floor cupboard.

4.3.2.12.1.2 Qty 2: 4 000 x 450mm Wooden fully furnished kitchenette wall mounted cupboard.

4.3.2.12.1.3 Qty 2: 600 x 2 000mm Wooden fully furnished kitchenette wall fitted broom cupboard.

4.3.2.12.1.4 Qty 4: Wooden fully furnished vanity cupboards for bathrooms – as per architect / engineer recommendation.

4.3.2.12.1.5 Melamine formica tops for all bathroom and kitchenette work surfaces.

4.3.2.12.1.6 Signage as per SHEQ requirements.

4.3.2.12.1.7 Shelving in the strongroom and storeroom, as per architect / engineer recommendations.

4.3.3 HVAC

4.3.3.1 Air Conditioner:

4.3.3.1.1 Supply and install qty 2: 9 000Btu Split Unit Air Conditioner to be installed in the two offices in the workshop area.

4.3.3.1.2 Supply and install qty 1: 24 000Btu Split Unit Air Conditioner to be installed in the admin area.

4.3.3.1.3 Supply and install qty 1: Industrial ventilation extractor metal axial exhaust air blower fans to be installed in the workshop at the welding bay.

4.3.4 POWER

4.3.4.1 The premises will already be equipped with a 25mm^2, 4-core cable and 16mm^2 bare earth wire from the meter box to the location of the main distribution board.

4.3.4.2 This scope of work defines the scope of supply and work to be carried out from the supply cable termination to the main distribution board and the electrical installation thereafter.

4.3.4.3 All the work shall be done according to the SANS Applicable Standards [RD2], [RD5], [RD6], [RD7].

4.3.4.4 All wiring work shall be C.O.C certified by a competent and qualified person.

4.3.4.5 Main Distribution Board

4.3.4.5.1 Floor standing distribution board with a 70 Amp, 3 phase isolator with 30% spare capacity after all switchgear is installed.

4.3.4.5.2 Three phase supply cable of approximately 80m, to sub-distribution board 3 in the existing building (Students residence) to supply a 3 phase circuit breaker of 40 amps, see Figure 1.

4.3.4.5.3 Single phase supply cable of approximately 60m, to sub-distribution board 2 in the park home to supply a single phase circuit breaker of 50 Amps, as shown in Figure 1.

4.3.4.5.4 Single phase supply of approximately 10m, to sub-distribution board 1 in the administration part of the building, see Figure 1.

4.3.4.5.5 Single phase supply cable of approximately 40m, to supply power to the single phase gate motor, see Figure 1.

4.3.4.5.6 Single phase supply cable of approximately 40m, to supply power to the single phase borehole pump.

4.3.4.5.7 Single phase supply cable of approximately 40m, to supply power to the 2 pedestrian lights and the carport lights, Figure 2.

4.3.4.5.8 Single phase supply to 2 x 9000BTU air conditioners in offices.

4.3.4.5.9 Single phase supply to 6 industrial wall fans.

4.3.4.5.10 Single phase supply to 2 industrial heaters.

4.3.4.5.11 Single phase supply to 22 single phase socket outlets. (Not more than 7 outlets on a circuit)

4.3.4.5.12 Single phase supply to a 0,75 KW extractor fan motor.

4.3.4.5.13 Single phase supply to a 0,75 KW water pump motor.

4.3.4.5.14 Single phase supply to a 15 litre, 1.5 kW under counter geyser in student tearoom.

4.3.4.5.15 Single phase supply to a 7.5 litre, 1.5 kW water boiler in the student's tearoom.

4.3.4.5.16 Three phase supply to 3 x 16 Amp 5 pin socket outlets.

4.3.4.5.17 Three phase supply to 2 x 32 Amp 5 pin socket outlets.

4.3.4.5.18 Three phase supply to single phase lights in the workshop area (Lights must be balanced over the three phases and controlled with one-way switch and a contactor in the main distribution board.)

4.3.4.5.19 Single phase supply to the lights in the offices.

4.3.4.5.20 Single phase supply to lights in student’s tearoom, bathroom area and bathroom for people with a disability, see Figure 2

4.3.4.5.21 Single phase supply to all outside lights and controlled with a day/night switch and 220V relay. Must be on one circuit.

4.3.4.5.22 All lights must be LED lights and the lumens must be in accordance with regulations [RD6], see Figure 2.

4.3.4.5.23 Power skirting (P801, hammertone grey), for the reticulation of power, will be installed at a height of 900mm.

4.3.4.6 Sub-distribution Board 1

4.3.4.6.1 Flash mounted distribution board in the passage of the administration part of the main building with 20% spare capacity after all switchgear is installed.

4.3.4.6.2 Single phase main circuit breaker / isolator combination switch.

4.3.4.6.3 Supply for 24000BTU air conditioner in the administration office, see Figure 3 .

4.3.4.6.4 Supply for the fibre switch isolator in the passage.

4.3.4.6.5 Single phase supply to a 15 litre, 1.5 kW under counter geyser.

4.3.4.6.6 Supply for 14 socket outlets. (Not more than 5 socket outlets on a circuit)

4.3.4.6.7 Supply to the lights in the administration offices, strong room and bathroom area.

4.3.4.6.8 All lights must be LED lights and the lumens must be in accordance with regulations [RD7].

4.3.4.6.9 Power skirting (P801, white), for the reticulation of power, will be installed at a height of 150mm.

4.3.4.6.10 Various socket outlet circuits can be connected through a UPS that will stand in the passage.

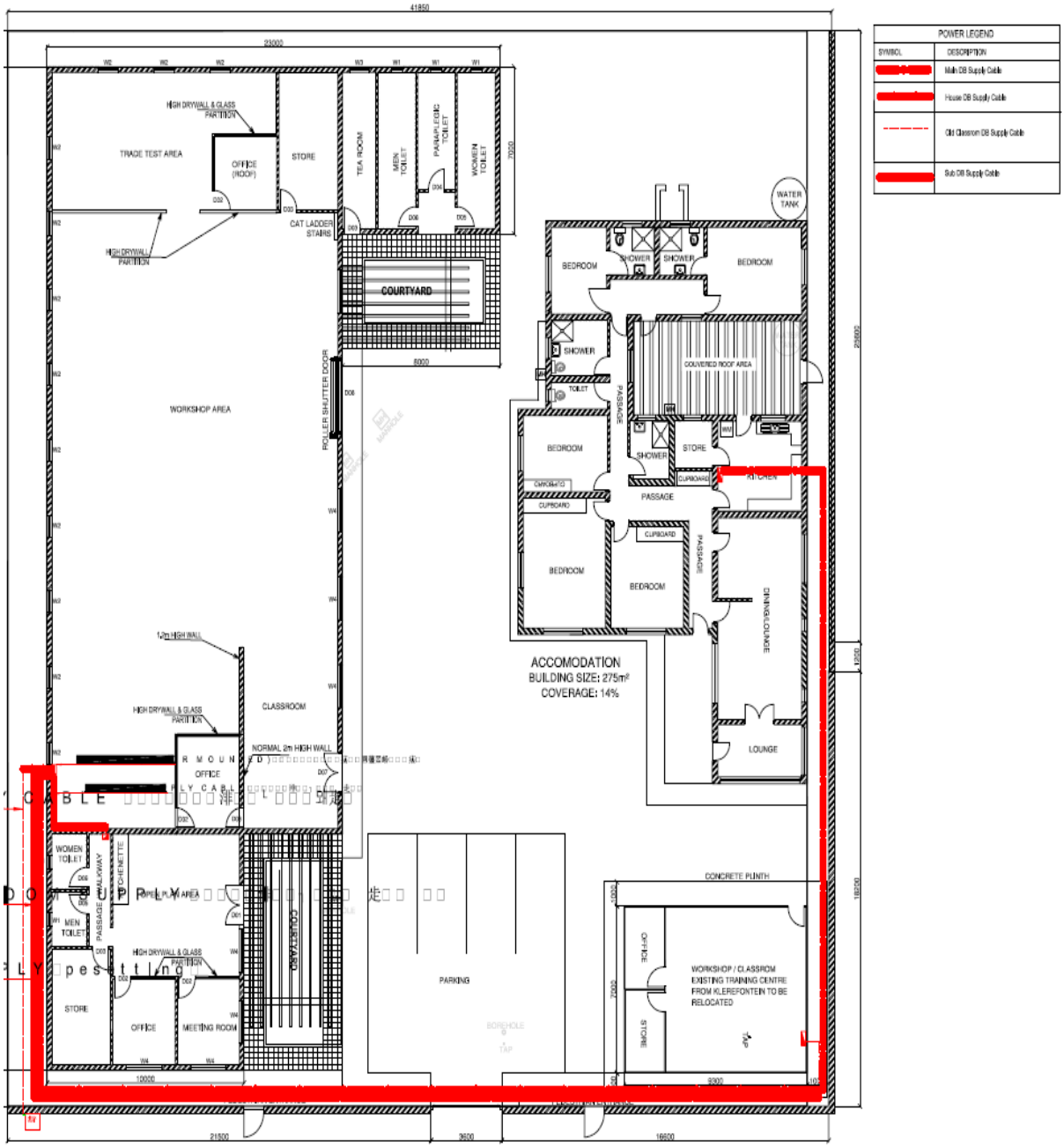

Figure 1: Proposed ATC Big Power Layout

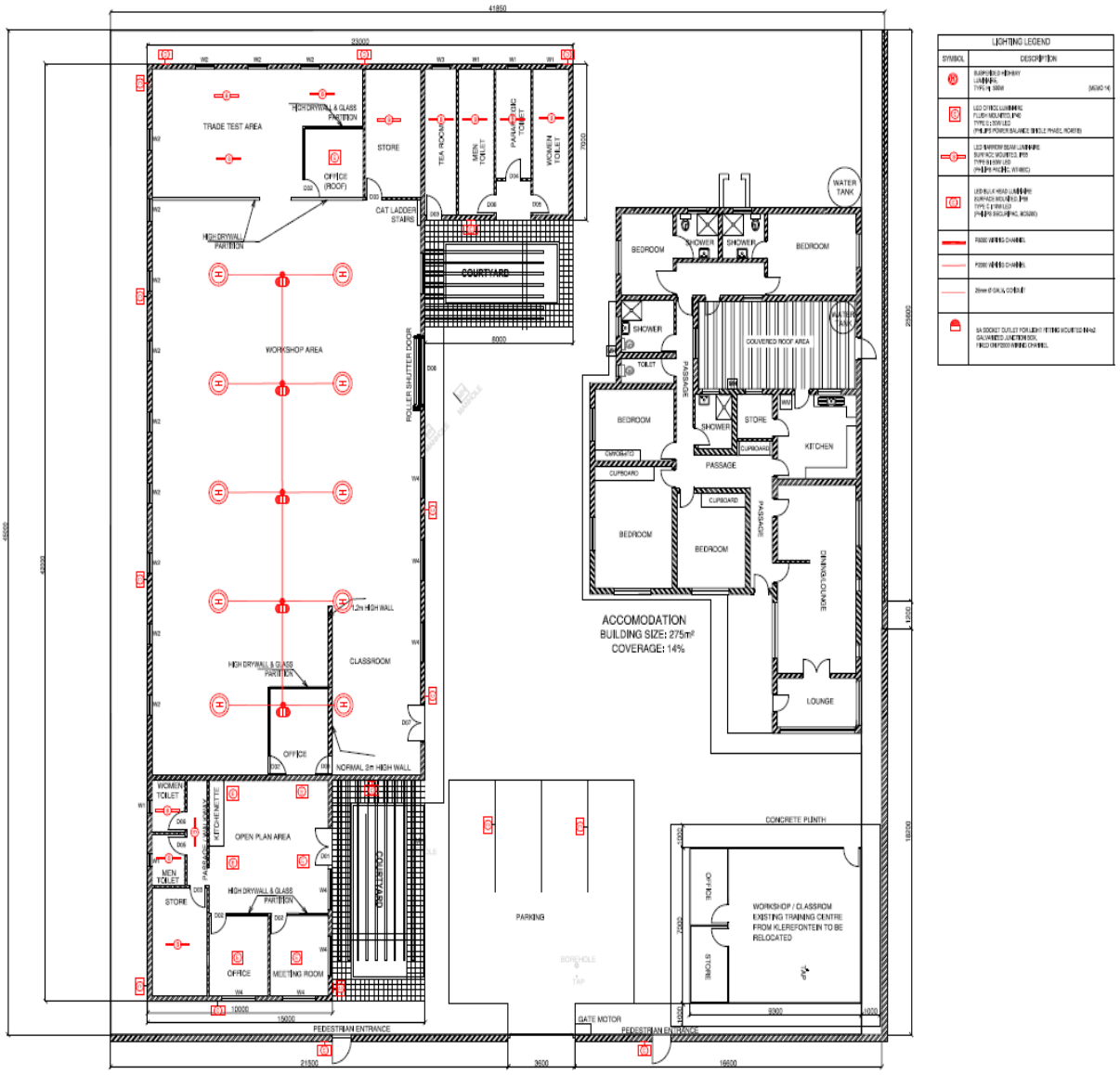

Figure 2: Proposed ATC Lighting Layout

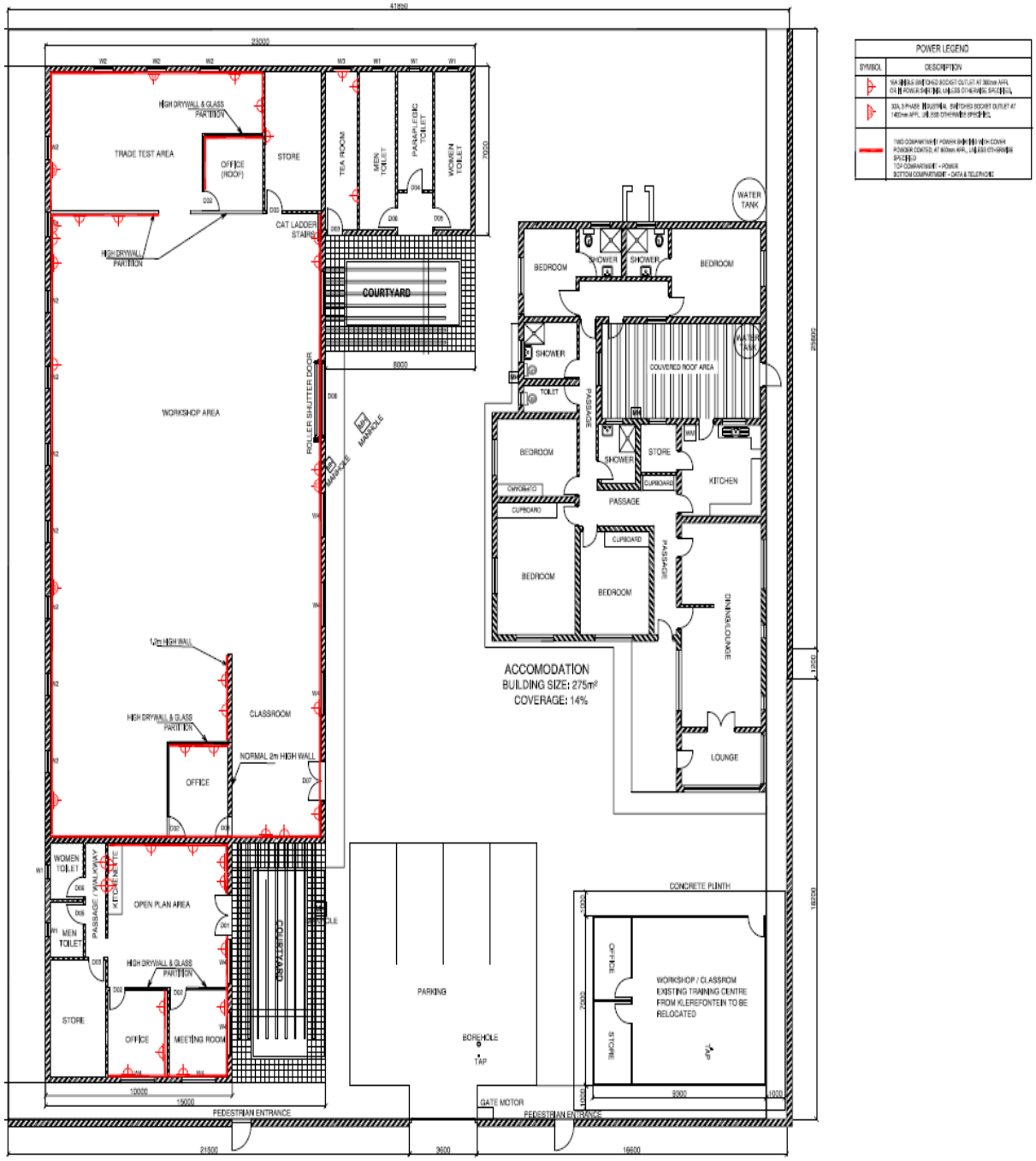

Figure 3: Small Power Layout for the Proposed ATC Building

Figure 4: Proposed ATC Isolator Layout

4.3.5 FIBRE AND NETWORK CONNECTION

4.3.5.1 Pre-installed Fibre Infrastructure

The following fibre infrastructure preparation work will have been carried out by SARAO personnel in preparation for the fibre contractor to come on site. This work is primarily external to the ATC property:

4.3.5.1.1 A 4-Way microduct will have been laid from the power pole located at 30° 57' 58.83"S, 22° 08' 11.83"E to the ATC property in accordance with Figure 5 below.

4.3.5.1.2 Two 1m manholes will be installed on either side of the fibre 110mm duct at the road crossing, one below the powerline and the second within the ATC property.

4.3.5.1.3 The 4-Way microduct will have been led up a galvanised Bosal pipe of minimum 3 metres secured to the power with 1 metre slack allowance of the microducts.

4.3.5.1.4 The 4-Way microduct from the power pole terminates in the 1 metre manhole within the ATC boundary.

4.3.5.2 Contractor Fibre Scope of Work

The following work is to be executed by the contractor for the Artisan Training Centre (ATC) implementation programme:

4.3.5.2.1 A new length of ADSS 24 fibre G.657 A1 fibre cable is to be suspended from pole 709 to the pole located at 30° 57' 58.83"S 22° 08' 11.83"E. At pole 709 the full 24 fibres are to be spliced to the existing ADSS fibre cable utilising the existing fibre dome joint. At the pole identified for the fibre drop-off to the ATC, 18 fibres are to be spliced through to the existing ADSS fibre cable feeding Bonteheuwel Library, 6 fibre are to be dropped off for connectivity to the ATC. A new 4-Entry dome joint is to be provided. See Figure 5 below.

4.3.5.2.2 The existing damaged section of ADSS fibre cable is to be dismantled and removed for safe disposal.

4.3.5.2.3 4-Way microduct is to be laid in parallel with the power cable in the power trench from the 1 metre manhole within the ATC property to the existing house and taken through to the network rack as per Figure 6 below. Required manholes and drawpits are to be installed and implemented.

4.3.5.2.4 A 40mm duct is to be laid from the existing house to the ex-Klerefontein classroom via the fibre manhole and drawpit and led into both facilities to the network racks. This duct is to accommodate an ethernet connection from the new network switch in the existing house through to the ex-Klerefontein classroom. See Figure 6 below.

4.3.5.2.5 A floor-mounted 22U 19" 600mm deep network cabinet is to be supplied and installed in the allocated position in the new ATC building. The rack must be equipped with a mesh door for cooling purposes and must be lockable. A 6-Way metal powerduct must be supplied and fitted to the cabinet.

4.3.5.2.6 A wall-mounted 15U 19" 450mm deep network cabinet is to be supplied and installed in the allocated position in the existing house. The rack must be equipped with a mesh door for cooling purposes and must be lockable. A 5-Way plastic powerduct must be supplied and fitted to the cabinet.

4.3.5.2.7 12 Core G.657 A1 fibre micro cable is to be blown into the microduct from the new dome joint on the power pole to a new 24 port LC patch panel installed in the ATC building and terminated. 6 Fibres are to be spliced to the ADSS cable back to the Carnarvon POP at the overhead joint and all 12 fibres are to be terminated on the first 12 connectors on the fibre panel.

4.3.5.2.8 12 Core G.657 A1 fibre micro cable is to be blown from the new 24 port LC patch panel installed in the ATC building in the microduct to a new 24 port LC patch panel installed in the existing house. This fibre is to be terminated on both ends.

4.3.5.2.8.1 On completion of installation and splicing, full fibre OTDR and fibre loss measurements must be done, witnessed by SARAO personnel, and provided in electronic format for SARAO records:

4.3.5.2.8.2 Carnarvon POP to new ATC patch panel (6 fibres).

4.3.5.2.8.3 Carnarvon POP to Bonteheuwel Library (18 fibres).

4.3.5.2.8.4 New ATC patch panel (new building) to new ATC patch panel (existing house) - (24 fibres).

4.3.5.3 Installation Notes:

4.3.5.3.1 SARAO will provide the following:

4.3.5.3.1.1 Concrete manholes and drawpits

4.3.5.3.1.2 40mm Subduct

4.3.5.3.2 The 4-Way microduct, plus the 40mm subduct, must be laid in suitable bedding as per the manufacturer's guidelines and the bend radii must not be exceeded. The Duraline 'DuraMulti DB Technical Specification' [RD10] is a good reference document.

4.3.5.3.3 2 X 110mm ducts are required across the ATC entrance gate: 1 for power, 1 for fibre.

4.3.5.3.4 The 19" patch panels must have LC UPC connectors, come supplied with necessary pigtails and splice trays, and must fold out and be accessible from the front. The panels will be installed in the top position of the network racks supplied by the contractor.

4.3.5.3.5 All fibre cable will be G.657 A1 compliant and will comprise Corning or Prysmian glass to interface to current site fibre cable type. Fibre cable will be received with test results from the manufacturer, and be tested on the drum prior to installation to verify the test results. Installation of the cable will comply with the manufacturer's specifications and guidelines. All fibre losses / splice losses will meet or be better than ITU specification G.657 A1 [RD11]. High loss fibres and/or splices or failed fibres will not be accepted.

4.3.5.3.6 Where the microduct is led up an external wall for access to the ceiling void, a suitable protective cover must be implemented to protect the 4-Way microduct and 40mm subduct.

4.3.5.4 Networking

4.3.5.4.1 CAT6A network cabling and keystones to be used for all installations.

4.3.5.4.2 2 x 24 port CAT6A patch panels to be installed - one in the new building and one in the existing house. The patch panels will go into existing racks.

4.3.5.4.3 1m CAT6A Patch leads are to be provided per patch panel point to connect to switch in rack.

4.3.5.4.4 Refer to map in Figure 7 below for location of network points and patch panels in Rack Cabinets.

4.3.5.4.5 Blue network points to be installed at floor level unless stated “Roof Mount” in which case they are to be mounted on the roof for connection to future Wifi Access Point.

4.3.5.4.6 Magenta network points to be installed in a suitable location for connection to externally mounted IP CCTV Cameras.

4.3.5.4.7 Each installed network point is to be provided with a 3m CAT6A patch lead.

4.3.5.4.8 All cabling to be run in existing trunking where possible. Where no trunking exists, the contractor is to provide and install trunking.

4.3.5.4.9 Training Centre: Installation of 22 network points.

4.3.5.4.10 Existing House: Installation of 8 network points

4.3.5.4.11 Ex-Klerefontein Classroom: Installation of 3 network points. Network cables to be run through an installed duct between classroom and existing house.

4.3.5.4.12 Power points to be provided at the network rack to provide power for UPS and switch.

4.3.5.4.13 Refer to Figure 7 below for network point installation.

4.3.5.4.14 Test results to be provided for each installed network point - from the patch lead at the patch panel to the patch lead provided with the network point.

4.3.5.4.15 Patch panel and installed network points must be labelled - one should be able to trace any keystone to its corresponding point on the patch panel.

4.3.5.4.16 Each 1m patch lead provided for each patch panel port to be uniquely labelled on either end.

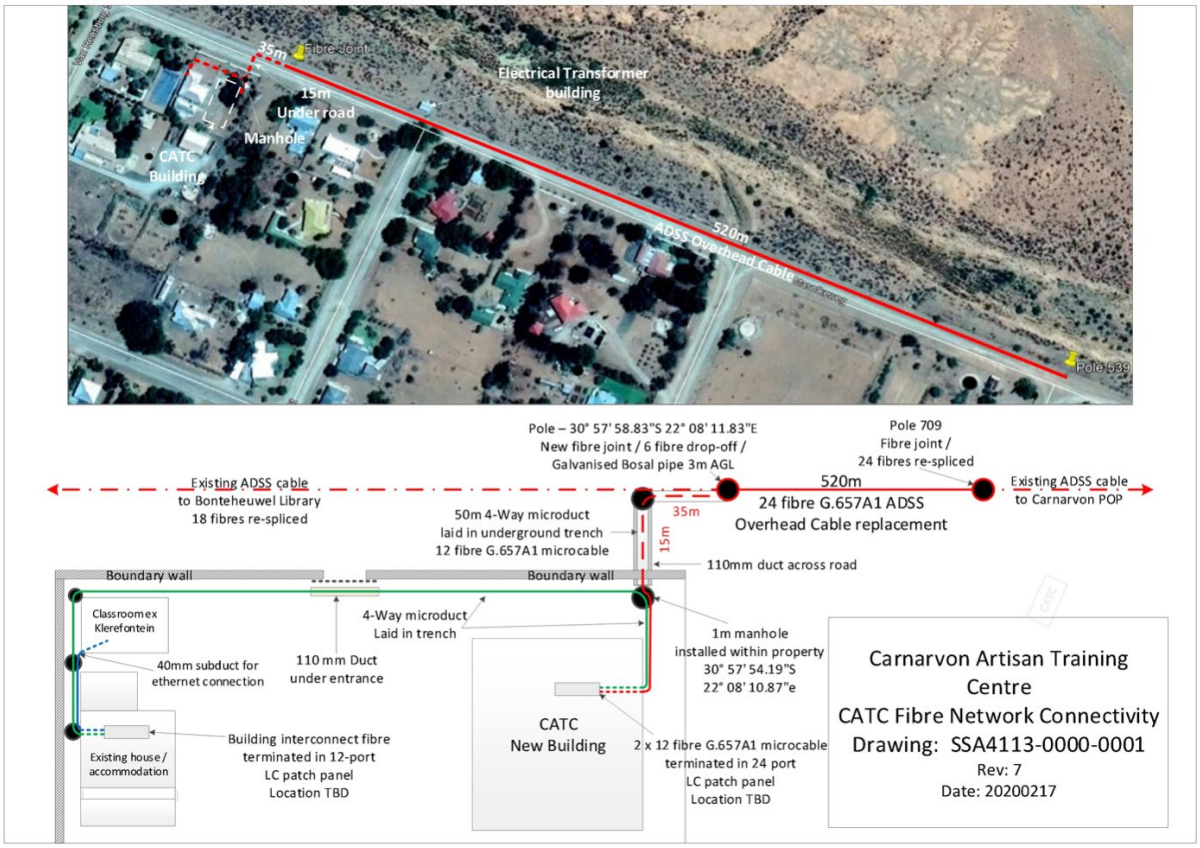

Figure 5: Artisan Training Centre Fibre connectivity

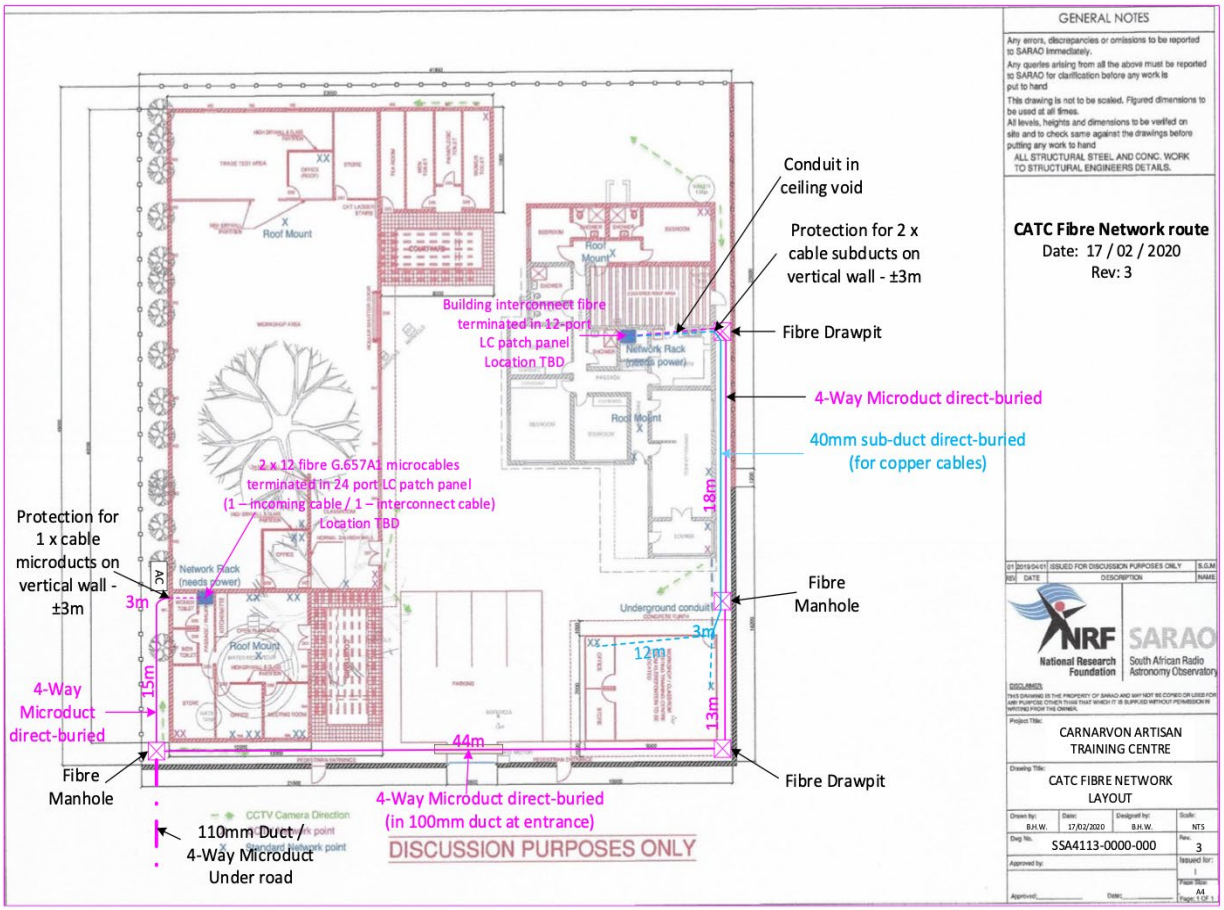

Figure 6: Artisan Training Centre fibre network layout

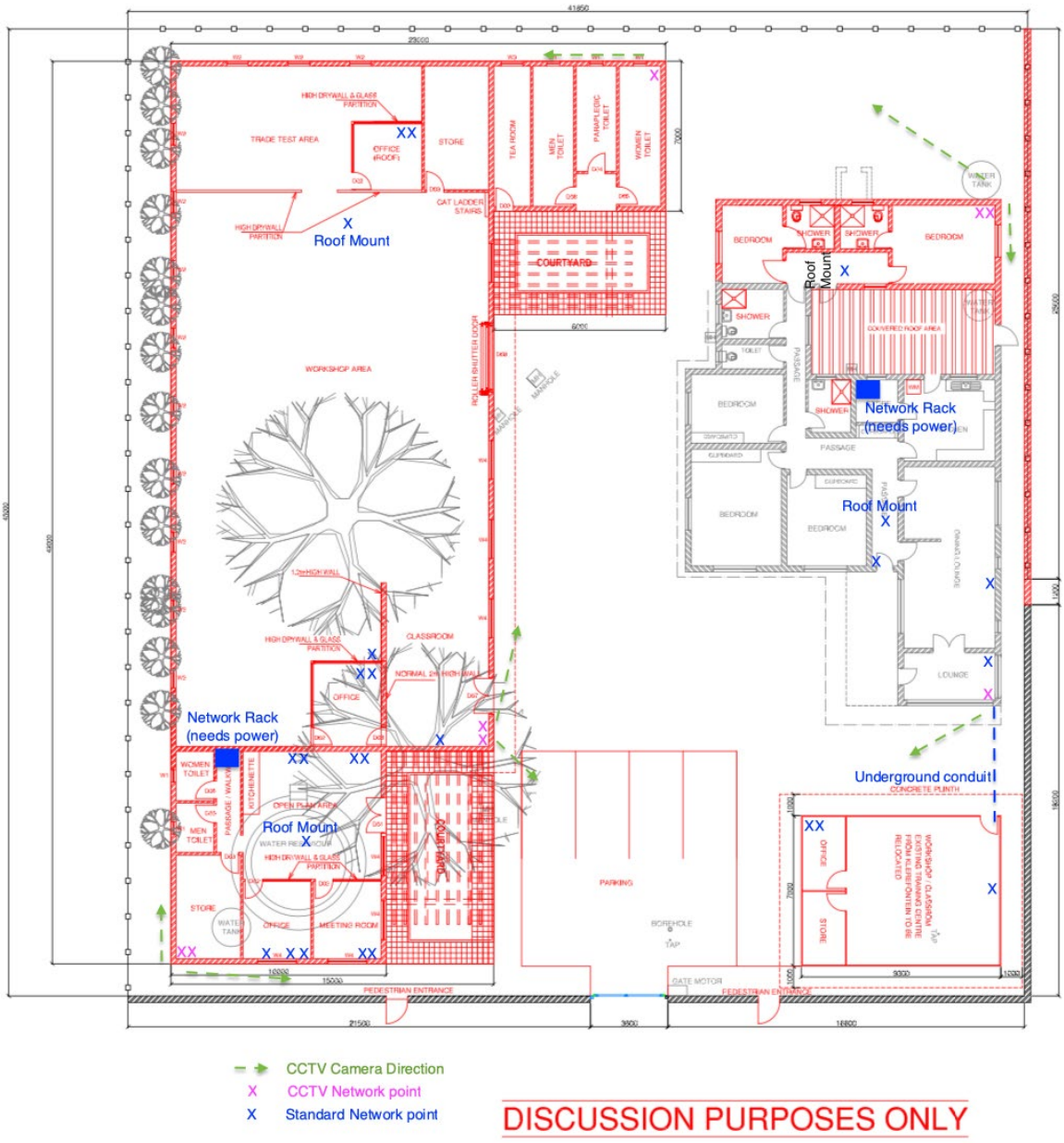

Figure 7: Network Point Layout

4.4 EXISTING BUILDING

4.4.1 OVERVIEW OF RENOVATIONS

4.4.1.1 The existing building will be completely renovated internally to create two additional bedrooms with en-suites. This involves sealing off the existing garage door and installing a window.

4.4.1.2 A covered roof area will be erected over the rear courtyard of the existing building, to provide a sheltered seating area.

4.4.1.3 The existing ablution facilities will be upgraded to provide a unisex and disabled persons bathroom.

4.4.1.4 The kitchen will be upgraded with new cupboards and equipment.

4.4.1.5 All internal and external walls and all ceilings and floors will be renovated and painted/treated.

4.4.1.6 The electrical system and lighting will be rewired and made compliant.

4.4.1.7 Security will be upgraded by adding additional burglar bars, access gates with access control, while a concrete access ramp for disabled students will be constructed.

4.4.2 REQUIREMENTS FOR THE CONTRACTOR

4.4.2.1 Alterations

4.4.2.1.1 In taking down and removing existing works the utmost care shall be observed to prevent any structural or other damage to remaining portions of the building. The Contractor shall ensure the stability of all structures during alteration work.

4.4.2.1.2 Special care shall be exercised during the progress of the work to ensure that any electrical installations, water supply pipes, telephone and other services which may be encountered are not interfered with and notice shall be given to the Principal Agent if any disconnection or alterations become necessary.

4.4.2.1.3 The Contractor shall take all precautions necessary to prevent any nuisance from dust whilst carrying out the work.

4.4.2.2 Materials from the Alterations, Credit, Etc.

4.4.2.2.1 Materials recovered from the alterations (except where described as to be re-used or to be handed over to the Employer) will become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials shall not be re-used in new work without written permission from the Principal Agent.

4.4.2.2.2 Materials described as “removed” shall be removed from the site immediately.

4.4.2.2.3 Materials described as “handed over to the Employer” shall be carefully dismantled where necessary, neatly stored under cover on the site where directed and protected from damage, until required.

4.4.2.2.4 Materials described as “set aside for re-use” shall be carefully dismantled where necessary, cleaned, neatly stored under cover and protected from damage until required for re-use. Any damage caused to such materials during removal, storage or refixing shall be made good at the Contractor’s expense.

4.4.2.3 Disposal of Debris Etc.

4.4.2.3.1 The Contractor shall be responsible for the removal from the site of all materials, debris and rubbish resulting from the alterations.

4.4.2.4 Making Good Damaged Work

4.4.2.4.1 The Contractor shall make good in all trades to existing work where damaged or disturbed through the alterations with all necessary new materials to match the existing.

4.4.2.5 Forming New Openings or Altering Openings in Existing Walls

4.4.2.5.1 Where new openings are formed or openings altered in existing walls, the wall above the opening shall be broken out and a new brick, in situ concrete or prestressed concrete lintel inserted, complete with all necessary reinforcement, formwork, turning piece, etc, the jambs and portions of openings as described shall be built up with new brickwork or blockwork properly toothed and bonded to existing, cavities of hollow walls shall be closed where necessary and finishes shall be made good all round and into reveals.

4.4.2.6 Building up Openings

4.4.2.6.1 Where existing openings are given in number as built up, the existing surfaces all round shall be prepared as necessary, brickwork or blockwork properly toothed and bonded to existing, wedged up to underside of existing lintel and finishes shall be made good on both sides.

4.4.3 SUBSTRUCTURE

4.4.3.1 Foundations

4.4.3.1.1 500 x 500mm Slab thickening

4.4.3.2 Ground Floor Construction

4.4.3.2.1 25MPa/19mm concrete patching to exposed surface.

4.4.3.3 Floors

4.4.3.3.1 Internal Finishes:

4.4.3.3.1.1 Timber floor to be sealed including sanding for all existing wooden floors.

4.4.3.3.1.2 Ceramic floor tiles in the toilets and kitchen at (PC = R100/m^2 tiles only)

4.4.3.3.1.3 Ceramic floor tiles to all new back rooms (PC = R100/m^2 tiles only)

4.4.3.3.1.4 75mm tile skirting on walls.

4.4.3.3.1.5 External floor tiles for the courtyard/atrium area.

4.4.3.3.1.6 Gloss Wood varnish for all existing wardrobes.

4.4.3.3.2 External Finishes:

4.4.3.3.2.1 High Pressure cleaning for veranda floor tiles.

4.4.4 SUPERSTRUCTURE

4.4.4.1 Brickwork:

4.4.4.1.1 Brickwork of NFP 14MPa bricks in class II mortar.

4.4.4.2 Internal Finishes

4.4.4.2.1 Plaster to walls:

4.4.4.2.1.1 Cement plaster (1:5) on brickwork and concrete wall to a smooth finish.

4.4.4.2.2 Paint to walls:

4.4.4.2.2.1 One coat alkali resistant primer and two coats acrylic emulsion paint on brickwork and concrete wall.

4.4.4.2.3 Wall Tiles:

4.4.4.2.3.1 Allow the prime cost amount of R100.00 (One hundred rand and nil cents) net per square metre excluding VAT for supply only of ceramic wall tiles for bathrooms and kitchen.

4.4.4.2.3.2 Wall tiles to 1 500mm

4.4.4.2.3.3 Floor tile skirting to 75mm below the wall tiles.

4.4.4.3 External Finishes

4.4.4.3.1 Plaster to new walls:

4.4.4.3.1.1 Cement plaster (1:5) on a brickwork wall to a smooth finish.

4.4.4.3.2 Paint to all walls:

4.4.4.3.2.1 One coat alkali resistant primer and two coats acrylic emulsion paint on brickwork.

4.4.4.4 Ceiling

4.4.4.4.1 The existing ceiling should be assessed and repaired accordingly.

4.4.4.4.2 Nailed Up Ceilings:

4.4.4.4.2.1 6,4mm Gypsum in one direction only. Fixed to 38x38mm SAP branders at 400mm centres, with H-profile joining strips.

4.4.4.4.2.2 100mm Aerolite thermal insulation closely fitted and laid on top of brandering between roof trusses and timbers.

4.4.4.4.3 Finishes:

4.4.4.4.3.1 White Acrylic sealer between cornice and ceiling.

4.4.4.4.3.2 Wall paint of 1 coat sealer and 2 coats white Polvin paint to new and existing ceiling.

4.4.4.5 Roof Covering

4.4.4.5.1 Pitched roof with gable ends with profiled sheeting and accessories:

4.4.4.5.1.1 Timber roof trusses shall be treated

4.4.4.5.1.2 Clear translucent roof sheeting for Atrium, IBR Roof Sheeting covering to new timber construction at approximately 300mm centre including eave gutters and downpipes.

4.4.4.5.1.3 A five years guarantee shall be issued for site workmanship and water tightness.

4.4.4.5.1.4 Roofing shall be sealed for the entire house.

4.4.4.6 Doors and Ironmongery

4.4.4.6.1 Doors:

4.4.4.6.1.1 External: Wrought Meranti, 44mm framed batten doors, 813mm x 2032mm, with 44 x 107mm top rail and stiles, 22 x 107mm middle ledge and braces and 22 x 219mm bottom rail filled in with 107mm V-jointed one side boarding.

4.4.4.6.1.2 Internal: 40mm hollow core flush doors, 813mm x 2 032mm with 3,2mm standard hardboard covering on both sides.

4.4.4.6.1.3 Internal: Paraplegic timber door & frame, 1 000mm x 2 032mm.

4.4.4.6.2 Frames

4.4.4.6.2.1 Single door internal (813mm x 2 032mm): Galvanized pressed steel 1,6mm double rebated frames suitable for one brick wall.

4.4.4.6.2.2 813mm x 2 032mm High Security Gate for Single doors for the exterior of the house.

4.4.4.6.3 Ironmongery:

4.4.4.6.3.1 Refer to Ironmongery Trade in the detailed pricing schedule.

4.4.4.6.4 Finishes: Refer to Paintwork Trade in the detailed pricing schedule.

4.4.4.7 Windows

4.4.4.7.1 All new windows to be AAMSA approved Steel windows, to match the existing windows.

4.4.4.7.2 Aluminium framed Anti-mosquito nets fixed to bedroom windows only.

4.4.4.7.3 Steel burglar bars to all new and existing windows, full height and width of the frames.

4.4.4.7.4 Window scope of supply shall include glass, burglar bars and fixing in position.

4.4.4.7.5 All windows shall be sealed and protected against damage, deterioration or discolouration by taping with removable tape or covering with temporary casings or motor oil and removing same on completion.

4.4.4.7.6 Glazing

4.4.4.7.6.1 Any material used in the glazing of any building shall be of a secure and durable type and shall be fixed in a manner and position that will ensure that it will safely sustain any wind actions which can reasonably be expected, not allow penetration of water to the interior of the building and be apparent, in the case of clear glazing, to any person approaching such glazing

4.4.4.7.6.2 Glazing of windows to be done according to the National Building Regulations– Part N [RD1][RD2].

4.4.4.8 Plumbing and Drainage

4.4.4.8.1 Supply and install qty 4 WCs, including 1 off disabled persons' toilet.

4.4.4.8.1.1 Semi-close coupled 90° outlet, free standing WC suite comprising pan with "P' or "S' trap, 9 litre cistern complete with lid, fitments, flush pipe elbow, ball valve, and heavy duty double flap 'white' plastic seat.

4.4.4.8.1.2 Wall-mounted toilet paper dispenser per toilet.

4.4.4.8.2 Wash Hand Basin (WHB)

4.4.4.8.2.1 Supply and install qty 4 WHB, including 1-off disabled persons' WHB.

4.4.4.8.2.2 Wall mount or "drop-in" as per architect / engineers recommendation. WHB size approx. 510 x 400mm.

4.4.4.8.2.3 All WHB to be supplied and fitted with Chrome Plated taps (hot and cold per WHB), ball valves, piping and traps.

4.4.4.8.2.4 The WHB fittings for the disabled bathroom to be of medical facility type.

4.4.4.8.2.5 Wall-mounted Soap Dispenser Stainless Steel Liquid Soap Box - 800ml

4.4.4.8.3 Supply and equip qty 4 showers:

4.4.4.8.3.1 900 x 1 850mm shower door and enclosures

4.4.4.8.3.2 Standard articulated shower head, with mixer unit.

4.4.4.8.4 Mirrors:

4.4.4.8.4.1 Supply and install qty 4 mirrors

4.4.4.8.4.2 Mirrors to be 776mm x 776mm, 3mm thick silvered float glass copper backed mirrors with polished edges, holed for and fixed with chromium plated dome capped mirror screws with rubber buffers to plugs in brickwork.

4.4.4.8.5 Qty 2: 40mm x 400mm Stainless steel safety grab bar rail, Safety oblique bar rails as appropriate for the disabled persons' bathroom.

4.4.4.8.6 Qty 4: Utility hooks at showers, 1 600mm from floor.

4.4.4.8.7 Supply and Install Two 200L Geysers.

4.4.4.8.8 Assess and advise on grey water separation and storage systems, utilise a specialist consultant if required.

4.4.4.9 Sundries

4.4.4.9.1 Wooden wardrobes for the bedrooms.

4.4.4.9.2 8000 x 880mm Wooden fully furnished kitchenette floor cupboard as per the engineers specification.

4.4.4.9.3 4000 x 900mm Wooden fully furnished kitchenette wall mounted cupboard as per the engineers specification.

4.4.4.9.4 Melamine formica tops of 600mm depth.

4.4.4.9.5 Appliances: Supply and install the following appliances:

4.4.4.9.5.1 Electrical hob, 600mm 4-plate with cooker hood / extractor fan.

4.4.4.9.5.2 Microwave, convection combination, 40L

4.4.4.9.5.3 Refrigerator, top fridge bottom freezer combination, 360L.

4.4.4.9.5.4 Washing machine, top-loader, 13kg. (Industrial Size)

4.4.4.10 HVAC

4.4.4.10.1 Supply and install a 24000Btu Split Unit Air Conditioner with the indoor unit in the lounge.

4.4.5 POWER FOR EXISTING ATC HOUSE

This part of the report covers the scope of work for power to be carried out within the existing ATC building.

4.4.5.1 This defines the electrical scope of supply and work to be carried out within the existing ATC building.

4.4.5.2 All the work shall be done according to the SANS Applicable Standards [RD2], [RD5], [RD6], [RD7].

4.4.5.3 All wiring work shall be C.O.C certified by a competent and qualified person.

4.4.5.4 Sub-distribution Board 3

Note: Refer to Figure 1, Figure 4 and Figure 8.

4.4.5.4.1 The existing house (Students residence) must be rewired and balance over three phases

4.4.5.4.2 Wall mounted distribution board in the kitchen with 20% spare capacity after all switchgear is installed.

4.4.5.4.3 Three phase 40 Amp main circuit breaker.

4.4.5.4.4 Single phase supply for a 24 000BTU air conditioner in the sitting room.

4.4.5.4.5 Single phase supply for 2 x 200 litre geyser.

4.4.5.4.6 Single phase supply for stove with 4 plates (Hob)

4.4.5.4.7 Single phase supply for the fibre switch isolator in the pantry.

4.4.5.4.8 Single phase supply for 0.75 kW water pump motor.

4.4.5.4.9 Single phase supply for 16 x double socket outlets. (Bedrooms must have a double socket outlet, kitchen must have 3 socket outlets and one outlet must have its own circuit) All socket installations shall conform to the requirements of SANS 10142-1:2017 [RD5] and shall include at least one SANS 164-2 (IEC Type N) [RD12] socket.

4.4.5.4.10 Single phase supply for fan / lights and lights. (Bedrooms must have fans with lights)

4.4.5.4.11 Single phase supply to all outside lights and controlled with a day/night switch and shall be on one circuit.

4.4.5.4.12 All outside lights shall be LED lights.

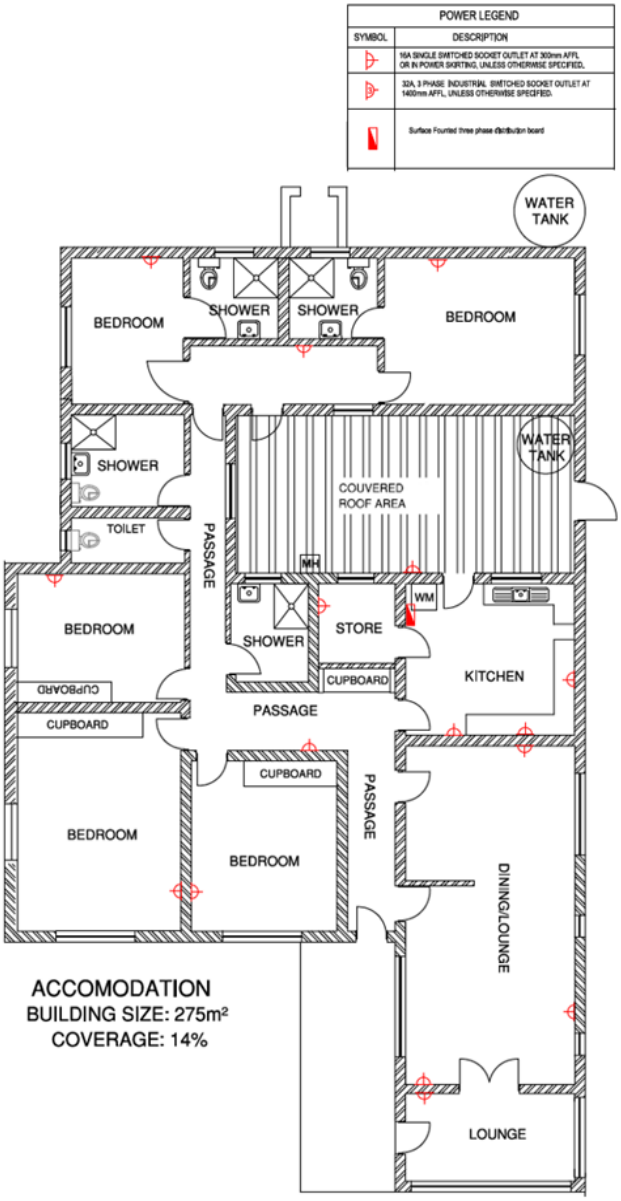

Figure 8: 3-phase power supply for existing ATC House

4.5 SITE WORKS AND SERVICES

4.5.1 PREPARED ACCESS

4.5.1.1 Provide 4m wide driveway to 10m x 10m parking area. The scope includes preparation of ground, provision of substrate and paving and installation.

4.5.1.2 The paving shall be as per engineer's recommendation.

4.5.2 SHELTERED PARKING

4.5.2.1 Supply and erect a pre-manufactured galvanized steel carport of dimensions 10m wide, 6m deep and 3.0m high over the paved parking area.

4.5.2.2 All hardware, gutters, posts, IBR roof sheets & build instructions are to be included.

4.5.2.3 If specifically engineer designed for this application, an engineer's certificate is to be provided.

4.5.3 SITE GENERAL

4.5.3.1 Clear the site and cut away obstructing trees.

4.5.3.2 Install stone landscaping – crushed slate to be provided by SARAO on site.

4.5.4 SOIL DRAINAGE:

4.5.4.1 Supply and install HDPE drain pipes and fittings including electro weld sleeve couplings complying with SANS 791 [RD13].

4.5.5 STORM WATER DRAINAGE:

4.5.5.1 Storm-water Channel:

4.5.5.1.1 Install a 300 x 300mm Precast concrete storm water U-Channel to divert the storm water flow through the property to the municipal storm water system.

4.5.6 WASTE WATER DISPOSAL:

4.5.6.1.1 Supply and install Septic Tank suitable for a waste water storage system for 12 people to be embedded to the correct depth as per the engineer's recommendation.

4.5.6.1.2 The Septic Tanks shall be located close to the paved parking area for ease of access by tanker vehicles dependent on engineers recommendation.

4.5.7 WATER SUPPLY:

4.5.7.1 Supply and install the fresh water supply utilising 32mm HDPE pipe below natural ground level including fittings.

4.5.7.2 Supply and position of 2 rainwater tanks of 2 500 litre capacity each.

4.5.7.3 The scope of supply shall include all plinths, and fittings, including a 0.75kW Booster Pump & Tank Connector Kit for each of the two rainwater tanks.

4.5.7.4 Remove, in a serviceable condition, the existing water tank including steel frame to be kept safe at a location determined by SARAO.

4.5.7.5 Breakdown and remove existing water reservoir with concrete platform and level the site thereafter.

4.5.8 BOUNDARY, GATES ETC.

4.5.8.1 Break down, remove and rebuild 220mm brickwork boundary wall with face brick and the following access:

4.5.8.1.1 2-off, Single Pedestrian gates of approx. 880mm, one either side of the vehicle gate.

4.5.8.1.2 A single 4 000mm sliding vehicle gate with Gate motor.

4.5.8.1.3 The gate motor is to be provided in a locking anti-theft bracket.

4.5.8.2 Carefully take out and remove existing welded mesh fence and hand over to SARAO.

4.5.8.3 Carefully remove the existing 3,5m sliding gate and hand over to SARAO.

4.5.8.4 Install a 1,8m High, welded mesh fence on the perimeter of the eastern and southern side of the property.

4.5.8.5 Erect a boundary wall on the western side of the property to 1.8m.

4.5.8.6 All entrances to the training centre and house shall have access ramps of 25MPa/19mm concrete.

4.5.9 CONCRETE PLATFORM

4.5.9.1 Design and implement a level, 100mm thick concrete plinth for a 9100mm x 6600mm Prefabricated Classroom (to be supplied by SARAO).

4.5.9.2 The plinth shall be at least 11100mm x 8600mm (1000mm concrete surround on all sides).

4.5.9.3 The plinth shall be in the North West Corner of the property (against the Masolkeweg boundary), illustrated in the bottom right corner of Figure 7 (and others) for reference.

4.5.9.4 Electrical and fibre connections to the Prefabricated Classroom are as per the relevant sections.

4.5.10 SIGNAGE:

4.5.10.1 Corporate signage is to be installed, the design and dimensions are to be confirmed.

4.5.10.2 The Assembly Point and Smoking Area are to be identified and positively identified through the supply of compliant signage.

5 ENVIRONMENTAL ELEMENTS

5.1 ENVIRONMENTAL REGULATORY COMPLIANCE

5.1.1 Submission of a Method Statement on environmental management shall be part of the contract conditions between SARAO and the appointed contractor, in line with the approved environmental application.

5.2 WASTE MANAGEMENT

5.2.1 Submission of a Method Statement on waste management shall be part of the contract conditions between SARAO and the appointed contractor.

5.2.2 The following must be included:

5.2.2.1 Disposal of general waste

5.2.2.2 Disposal of hazardous waste

5.2.2.3 Transportation of waste

5.2.2.4 Landfill site which the contractor will be disposing waste at

5.3 POLLUTION CONTROL

5.3.1 The following method statement must be required from the appointed contractor:

5.3.1.1 Dust emission control

5.3.1.2 Water Pollution Control

5.3.1.3 Vehicle and equipment washing

5.3.1.4 Clearing of vegetation

6 QUALITY MANAGEMENT

6.1 The contractor shall provide SARAO with the following documents for approval:

6.1.1 Quality Management Plan.

6.1.2 Quality Policy.

6.2 The Contractor shall operate a Quality Management System (QMS) that complies with the requirements stated in the Scope. The Contractor shall provide SARAO a Quality Policy statement & a Quality Management Plan for acceptance.

6.3 QUALITY POLICY

6.4 The contractor shall establish, implement and maintain a Quality policy that includes a commitment to satisfy applicable requirements appropriate to the contract and continual improvement throughout the application of the Quality Management Plan.

6.4.1 QUALITY MANAGEMENT PLAN

6.4.2 The Quality Management Plan shall define quality processes and procedures relevant to the Scope of Work. It shall include, but are not limited to the following:

6.4.2.1 Quality Policies,

6.4.2.2 Quality Objectives,

6.4.2.3 Compliance to applicable statutory and legal requirements,

6.4.2.4 Control of documents and records,

6.4.2.5 Roles and Responsibilities,

6.4.2.6 Internal quality audits,

6.4.2.7 External Audits (by SARAO),

6.4.2.8 Quality control in the form of:

6.4.2.8.1 Maintaining standards during manufacture of products by testing of samples of the output against specified SARAO expectations,

6.4.2.9 Tests, Inspections & Records,

6.4.2.10 Control of:

6.4.2.10.1 Non Conformances,

6.4.2.10.2 Corrective actions,

6.4.2.10.3 Procurement.

7 HEALTH & SAFETY

7.1 The architect / engineer shall work together with the SARAO SHEQ representative and project manager to ensure that the appointed contractor compiles and maintains a Health and Safety File as per the checklist provided in Figure 9 below.

NRF National Research Foundation | SARAO South African Radio Astronomy Observatory

CHECKLIST CONTENTS OF HEALTH AND SAFETY FILE FOR CONSTRUCTION COMPANIES

Doc No. SHEQ – 003 Rev 1

NO	FILE CONTENTS	YES	NO	N/A	REMARKS
1	Occupational Health and Safety Policy				
2	Legal Appointed Letters as per regulations				
3	Legal Agreements Section 37(2) OHS Act 85 of 1993 and Regulations Client Specifications as per Regulation 4(1)(a)				
4	Letter of Appointment as contractor through DOL - Construction Regulation 5(3)(f) of the OHS Act 85 of 1993.				
5	Letter of Good Standing Construction Regulation 5(3)(f) of the OHS Act 85 of 1993.				
6	COIDA - Letter of Good Standing				
7	Notification of Construction work				
8	Method Statement – Where required				
9	Safety Plan, Quality Plan, Env. Plan, Risk Plan.				
10	First Aiders, Boxes and Fire Fighting Equipment				
11	Inspection Registers				
12	P.P.E. Issue Register				
13	Toolbox Talks				
14	Accident / Incident Report General Administrative Regulation 9(3) – Annexure 1				
15	Certified copies of id's of all employees on site				
16	Drawings, Plans and Signs for construction work				
17	Medical Certificates – Fitness for duty				
18	Fall Protection Certificates				
19	Confine Spaces Permits – if and when required				
21	Training Certificates and Qualifications				
22	H/S registered Officer				
23	Hot Works Procedure				
24	Lock out Procedure – Permits – if and when required				
25	Housekeeping policy: during and after contracting				

File Approved By SARAO SHEQ DEP:-..... Date:-.....

Figure 9: SARAO Health and Safety File Checklist

8 VERIFICATION AND ACCEPTANCE

8.1 The contractor is required to show compliance with all the requirements of this scope as well as those of the recommendations or agreed performance throughout the execution of the project. This can be done in a phased approach to aid inspections where the evidence would be obscured by later developments. There are various verification methods for assessing the degree of compliance to requirements.

8.2 VERIFICATION METHODS

8.3 The following methods and will be applied at appropriate hold points / inspection points during design and construction:

8.3.1 INSPECTION.

8.3.1.1 Inspection covers activities of design review, including review of all supporting analysis, calculations and traceability to requirements or design brief. The design review hold points will be as per the agreed project plan.

8.3.1.2 Inspection also covers inspection of the physical works and materials when delivered to site and/or completed to a hold point where inspection is possible.

8.3.1.3 The construction inspection hold points will be as per the local municipal regulations as well as [RD1] and [RD2].

8.3.2 TEST

8.3.2.1 All certificates of compliance (CoC) shall be supported by a set of acceptance test results as performed by the supplier / installer against an approved acceptance test procedure (ATP).

8.3.2.2 ATPs will be drawn up by the supplier / installer and reviewed and accepted by the customer and/or his representative. These test procedures are to show that each and every element of the scope of supply and installation has been tested and proven to be functional, such as the electrical supply where each and every outlet shall be shown to function and such tests shall include showing that earth leakage and overload protection functions as per design.

8.3.2.3 The results of each item tested will be captured in an acceptance test report (essentially an ATP with results). Key configurations and components will be recorded in the acceptance test report.

8.3.3 DEMONSTRATION

8.3.3.1 Demonstration will be used during acceptance to demonstrate the functionality or performance of a supplied or installed system such as the CCTV system and its coverage, the alarm system, etc.

8.3.3.2 All demonstrations shall be performed against an agreed upon demonstration plan.

8.3.4 PHYSICAL CONFIGURATION AUDIT (PCA)

8.3.4.1 A PCA will be conducted prior to acceptance where the “as-built” is audited against the design and the configuration captured to the level required to efficiently manage, maintain and support the centre.

8.3.4.2 A product breakdown structure (PBS) to the level necessary to issue maintenance instructions and procure and stock maintenance components shall be prepared in support of the PCA.

8.3.4.3 All municipal approved architectural plans that required updating to reflect the “as-built” state shall be resubmitted to the municipality for inclusion in the municipal property record.

Carnarvon Artisan Training Centre - High Level Scope of Works

Final Audit Report 2020-06-29

Created:	2020-06-23
By:	Roger Young (ryoung@ska.ac.za)
Status:	Signed
Transaction ID:	CBJCHBCAABAAIyQv9vRSnTuNEC5gPZ_sbc7hkPUv1iyg

"Carnarvon Artisan Training Centre - High Level Scope of Works " History

Document created by Roger Young (ryoung@ska.ac.za)
2020-06-23 - 9:04:17 PM GMT- IP address: 102.39.40.201

Document e-signed by Roger Young (ryoung@ska.ac.za)
Signature Date: 2020-06-23 - 9:13:18 PM GMT - Time Source: server- IP address: 102.39.40.201

Document emailed to Craig Smith (csmith@ska.ac.za) for signature
2020-06-23 - 9:13:20 PM GMT

Email viewed by Craig Smith (csmith@ska.ac.za)
2020-06-24 - 10:30:40 AM GMT- IP address: 66.249.93.127

Email viewed by Craig Smith (csmith@ska.ac.za)
2020-06-26 - 12:31:27 PM GMT- IP address: 66.249.93.109

Document e-signed by Craig Smith (csmith@ska.ac.za)
Signature Date: 2020-06-26 - 12:54:10 PM GMT - Time Source: server- IP address: 102.36.159.1

Document emailed to Bruce Wallace (bwallace@ska.ac.za) for signature
2020-06-26 - 12:54:17 PM GMT

Email viewed by Bruce Wallace (bwallace@ska.ac.za)
2020-06-29 - 6:07:39 AM GMT- IP address: 197.82.197.217

Document e-signed by Bruce Wallace (bwallace@ska.ac.za)
Signature Date: 2020-06-29 - 6:20:02 AM GMT - Time Source: server- IP address: 197.82.197.217

Document emailed to Kim de Boer (kdeboer@ska.ac.za) for signature
2020-06-29 - 6:20:08 AM GMT

Email viewed by Kim de Boer (kdeboer@ska.ac.za)
2020-06-29 - 7:00:03 AM GMT- IP address: 197.229.141.136

Document e-signed by Kim de Boer (kdeboer@ska.ac.za)
Signature Date: 2020-06-29 - 7:01:33 AM GMT - Time Source: server- IP address: 197.229.141.213

Document emailed to Rosalynn Daka (rdaka@ska.ac.za) for signature
2020-06-29 - 7:01:36 AM GMT

Email viewed by Rosalynn Daka (rdaka@ska.ac.za)
2020-06-29 - 10:23:04 AM GMT- IP address: 66.249.93.117

Document e-signed by Rosalynn Daka (rdaka@ska.ac.za)
Signature Date: 2020-06-29 - 10:24:53 AM GMT - Time Source: server- IP address: 41.13.12.124

Document emailed to AD Brand (abrand@ska.ac.za) for signature
2020-06-29 - 10:24:55 AM GMT

Email viewed by AD Brand (abrand@ska.ac.za)
2020-06-29 - 10:37:28 AM GMT- IP address: 66.249.93.96

Document e-signed by AD Brand (abrand@ska.ac.za)
Signature Date: 2020-06-29 - 10:38:43 AM GMT - Time Source: server- IP address: 41.13.22.206

Document emailed to Justin Jonas (justin@ska.ac.za) for signature
2020-06-29 - 10:38:45 AM GMT

Email viewed by Justin Jonas (justin@ska.ac.za)
2020-06-29 - 10:38:57 AM GMT- IP address: 197.229.134.7

Document e-signed by Justin Jonas (justin@ska.ac.za)
Signature Date: 2020-06-29 - 10:42:45 AM GMT - Time Source: server- IP address: 197.229.134.7

Signed document emailed to AD Brand (abrand@ska.ac.za), Justin Jonas (justin@ska.ac.za), Craig Smith (csmith@ska.ac.za), Kim de Boer (kdeboer@ska.ac.za), and 3 more
2020-06-29 - 10:42:45 AM GMT