

#### 1.4.1 Applicable Legislation

Standard	Subject
SANS 10400	The application of the National Building Regulations
OHS Act	Occupational Health and Safety Act No. 85 of 1993 as amended
Post Office Act	Act No 44 of 1958
Telecommunications Act	Act No 103 of 1996
Government Regulation R1593	Government Gazette No 11458

#### 1.4.2 SABS Codes of Practice

Code No.	Title
SANS 10108	The classification of hazardous locations and the selection of electrical apparatus for use in such locations.
SANS 10142	The Wiring of Premises Part 1: Low-voltage installations
SANS 10222 -3	Electrical security installations Part 3: Electric security fences (non-lethal)
SANS 60335-2-76	Household and similar electrical appliances - Safety Part 2-76: Particular requirements for electric fence energizers
SANS 214-1	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus Part 1: Emission

#### 1.4.3 Drawings

Drawing No.	Rev	Title
A4XY10-000-65-SK-001	0	Perimeter Barrier Protection Electric Fence Detail

#### 1.4.4 Specifications

Specification No.	Rev	Title
A4XY-TPL-210-001	0	Perimeter Barrier Protection Specifications to Meet NKP Requirements

## 1.5. GENERAL

The electric fence shall be 6 strands mounted on top of a solid wall, steel palisade fence or steel mesh fence and shall provide a physical barrier to detect any intrusion attempts. The system shall operate as a zoned, automatic, supervised, detection sensor system, capable of integration with the Security Management System (SMS) to detect and annunciate an attempted breach of the perimeter fence by an intruder. Should any person attempt to defeat the electric fence by way of climbing, touching, cutting or spacing the wires an alarm shall be annunciated as a perimeter alarm on the security management system.

The Electric Fence System (EFS) shall:

- Be installed on the perimeter barrier fence as described in the perimeter fence specification and integrated to the security management system.
- Monitor the status of fence cabling, devices, tampers and the like and provide control of zone status (i.e. isolate/access/secure)
- Provide independent zone control and alarm display via the security management system.
- Provide full performance and functionality as described in the relevant specification clauses.

## 1.6. GENERAL SYSTEM REQUIREMENTS

The electric fence system shall be made up of a horizontal grid of alternate positive and earth wires. The electric fence shall be a proven system with demonstrated performance to detect:

- A short on the fence caused by climbing or other interference with the fence structure.
- Cutting of any wire or lead-out to the fence structure.
- Tampering with any of the system enclosures, energizer monitor units, or remote keypads.
- The accidental or willful loss of mains power, battery power, and the communication system of the electric fence controllers to the security management system.



Fence line energizer performance and alarm sensitivity programming in each zone shall be achieved through local keypad command, and will include the ability to cut power from the energizer in the event of alarm activation. Overall the EFS shall be fully integrated at high level with the SMS for alarm and EFS function monitoring, logging of alarms and the like.

The EFS controller will generate sector and tamper alarm signals, and indicate set or unset on each sector, as well as the status of mains power supply, battery power supply, and the energizer pulse.

From the SMS it should be possible to isolate the entire fence system, all zones in any individual sector, or any individual zone in any sector.

Warning signage as required by SANS 60335-2-76:2006(IEC 60335-2-76) shall be provided to both the internal and external sides of the fence to alert personnel of the dangers associated with the non-lethal voltage.

The EFS controllers should have test reports establishing compliance with safety standards and associated amendments of SANS 60335-2-76 and SANS 10222-3. Additionally the controllers should have test reports showing compliance with noise and emission standards SANS 214-1:2009 (CISPR 14 – 1).

The fence structure itself should be built to comply with the requirements of SANS 60335-2-76 and SANS 10222-3.

Any area of non-compliance must be stated.

## 2 ELECTRIC FENCE SYSTEM

The electric fence system equipment shall include but not limited to the following:

- Fence energizer
- High tension stainless steel wire
- Fencing posts, stays, intermediates, brackets, wire tensioners and insulators.
- Warning signs
- High tension insulated cabling and conduit
- Earthing System

- Diagnostic mode

The fence controllers should have a suitably certified mains power supply and battery backup of not less than 8 hours. The power supplies for all fence controllers shall be connected to a manufacturer approved surge arrestor and not directly to a mains power point. Fence controllers shall be earthed in accordance with applicable standards and the recommendations of manufacturers for specific energizer monitor units.

## 2.2 CONDUCTING WIRE

The electric fence system shall form an array of horizontal pre-tensioned electrified wires carried on high quality insulators with vertical spacing of not more than 110mm. The fence wire shall be not less than 2.00mm diameter and shall be stainless steel. Wire tensioning can be achieved by end or in-line strainers and should not be excessive – no more than 20kg load per wire. It should be possible to squeeze together any two neighboring wires with moderate hand pressure.

## 2.3 FENCE POSTS, INSULATORS AND LEAD OUT CABLE

Fencing posts or brackets shall be manufactured from heavy galvanized steel and be sufficiently rigid to withstand the tension of the electric fence.

Each post should be spaced no more than 3m apart.

For posts requiring pre-punching or pre-drilling galvanizing shall occur after all fittings, mounting holes and the like are provided.

Insulators shall be made from high quality 100% virgin High Density Polyethylene and guaranteed against UV degradation for a period of 10 years.

All high voltage lead-out or underground cable shall be double insulated with an alloy or steel wire core of not less than 1.6mm diameter. Double core double insulated cables may be used for long lead-outs. Joining of lead-out cabling to the fence line wires may be done using crimp sleeves, crimp connectors, or heavy duty line clamps. All lead-out cabling should be contained in protective conduit and every effort must be made to keep it in a single unbroken length leading out to the zone.

All such HV cabling must be kept at least 150mm away from any LV cabling – such as is used for gate monitoring - that should be in a separate conduit. Particular care should be taken with the selection of a route for all such HV cabling. Site engineers should be consulted to ensure there is no risk of interference with any data, communication, PLC, or other LV cabling on site.

## 2.4 EARTHING AND LIGHTNING PROTECTION

This shall be in accordance with the requirements of SANS 10222-3:2006. The system to be employed shall be copper electrodes plus return earth wire. The earthing system must not be connected to the same earth systems as used by the local electricity supplier or communication provider (or both). The minimum distance

between the electric fence energizer earth and any electric supplier or communication system earth system shall be at least 2m.

The electric fence system shall be provided with lightning protection at the fence controllers and the local equipment cubicle.

### 3 INSTALLATION REQUIREMENTS

#### 3.1. CONSTRUCTION

The electric fence system shall be installed by a manufacturer approved contractor with specialist expertise and experience in their required fields. The use of suitably licensed tradesmen is compulsory.

The fence structure itself should be built to comply with the requirements of SANS 10222-3:2006.

The system shall be installed such that corners, gates, wall interfaces and posts do not cause a security weakness. Anti-climb configurations shall be fitted at all corners, double end strains, gate posts, and any other location where applicable.

The electric fence system shall be installed such that the safety of all persons is maintained during installation and subsequent system of operation.

The electric fence contractor shall be responsible for all cabling, conduit or duct, trenching, concrete, cutting and making good to the satisfaction of the Transnet representative.

All equipment shall be installed in the locations directed by the Transnet representative.

#### 3.2. TESTING

On completion of the fence system all zones should be tested and a test report signed off by the contractor and Transnet representative. Testing shall include the following:

- Test fence line voltages
- Test all fence alarms by shorting the fence and cutting a wire
- Test FASE mode
- Test all tamper alarms
- Test all system controls and monitoring
- Any other tests as appropriate for the site



#### 4 MANUFACTURERS CERTIFICATION

The electric fence contractor shall provide the manufacturer's certification that the electric fence detection system has been installed in accordance with the requisite standards and to the manufacturer's recommendations.

The electric fence contractor shall offer the appropriate service and maintenance contract to Transnet.

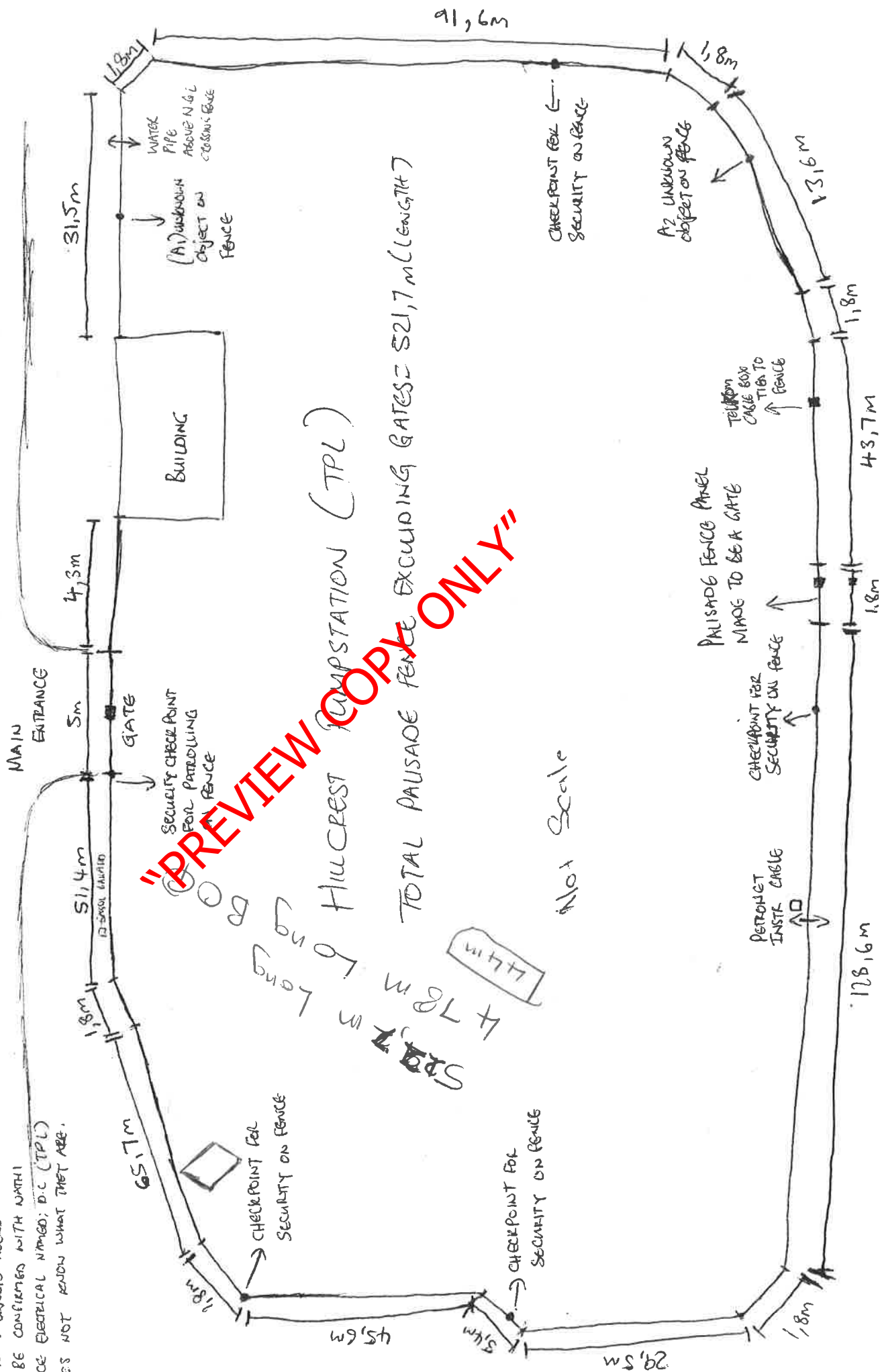
**"PREVIEW COPY ONLY"**

\* Security: Feniility  
 MANAGER: ~~W~~

No: 084 ~~238802~~

\* UNKNOWN OBJECTS NEEDS  
 TO BE CONFIRMED WITH WATHI  
 SINCE ELECTRICAL NAMED; D.C (TPL)  
 DOES NOT KNOW WHAT THEY ARE.

# SHONGWENI ROAD



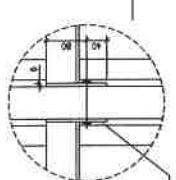
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Hillcrest Campstation (TPL)

TOTAL PALISADE FENCE EXCLUDING GATES = 521.7m (LENGTH)

No. 1 Scale

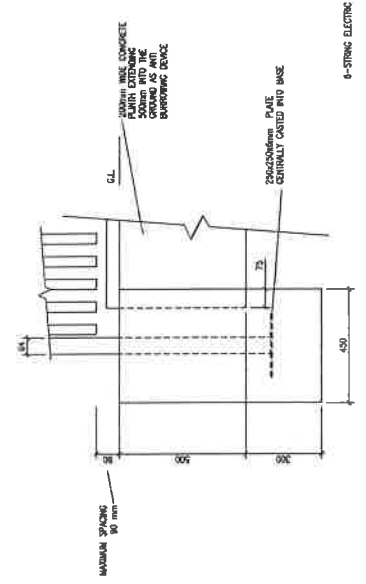
52.7m Long  
 47.8m Long  
 44m



NOTE: USE NON-REMOVABLE BOLTS. NO REMOVABLE BOLTS OR SCREWS WILL BE ALLOWED.

60x120x6mm PLATE WELDED TO END OF TOP/RAIL/POST RAIL AND BOLTED THROUGH THE RAIL AND POST. NON-REMOVABLE BALL.

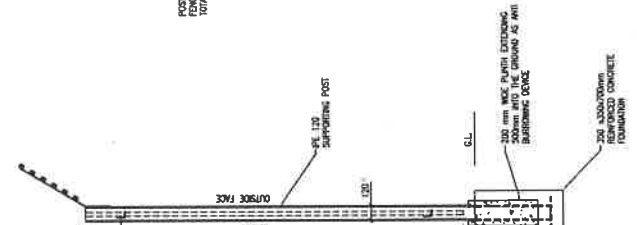
POST TO PANEL CONNECTION DETAIL 1:5



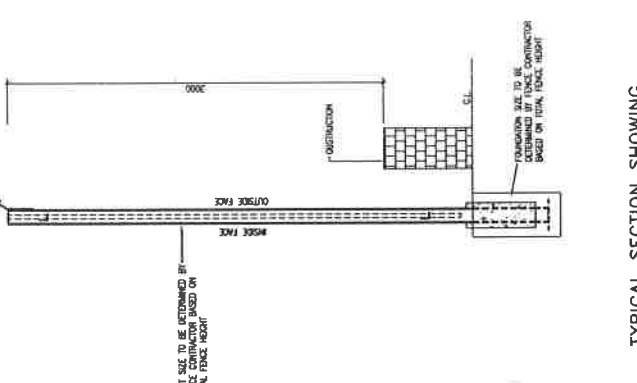
DETAIL 1 1:10

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NOTE: ALL STEELWORK AND ANCHORS SHALL BE GALVANIZED TO SABS 1200.



TYPICAL CROSS SECTION 1:20



TYPICAL SECTION SHOWING WALL RAISED 3m ABOVE AN ADJACENT OBSTRUCTION 1:20

FENCE ELEVATION 1:20

NAME	DATE	REVISION
DATE: 10/10/19		
BY: [Signature]		
CHKD: [Signature]		
APPROVED: [Signature]		
DATE: 12-01-19		
BY: [Signature]		
CHKD: [Signature]		
APPROVED: [Signature]		

REFERENCE DRAWINGS: —  
 AXY-000-155N-003 — PAUSADE SWING GATE  
 AXY-000-155N-004 — PAUSADE SLIDING GATE

- GENERAL NOTES:
- ALL WORK IN ACCORDANCE WITH RELEVANT SECTIONS OF SABS 1200.
  - DIMENSIONS TO BE CHECKED ON SITE AND ANY DISCREPANCIES BROUGHT TO ENGINEER'S NOTICE BEFORE ANY WORK IS PUT IN HAND.
  - CONCRETE TO BE CHECKED BY ENGINEER.
  - REINFORCING TO BE CHECKED BY ENGINEER.
  - ALL DUCTS OR RECESSES IN CONCRETE TO BE APPROVED BY ENGINEER.
  - CONCRETE GRADE = 30MPa @ 28 DAYS

REV	DATE	DRAWN	CHECKED	DESCRIPTION
1	09/10/19	AT	GA	ISSUED APPROVAL FOR CONSTRUCTION
0	15/07/19	AT	GA	ISSUED FOR CLIENT APPROVAL



PERIMETER BARRIER PROTECTION  
 STEEL PAUSADE FENCE  
 STANDARD DETAILS

FLUOR.IGODA

CLIENT: AXY  
 PROJECT: 000  
 DRAWING No: 15-01-19

DATE: 12-01-19

BY: [Signature]  
 CHKD: [Signature]  
 APPROVED: [Signature]