PART 3 & 4: WORKS INFORMATION.

SITE INFORMATION

THE DESIGN, UPGRADE, INSTALLATION AND COMMISSIONING OF AN EFFLUENT TREATMENT PLANT FOR THE BELLVILLE, SALDANHA, CAMBRIDGE AND SWARTKOPS, LOCOMOTIVE DEPOTS, TEN (10) MONTHS

Document reference	Title	No of pages
C3	**Works Information**	
C4	**Site information**	

	Name	Designation	Signature	Date
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C3.1 Works Information:

Design, Upgrade, Installation and Commissioning of Effluent Treatment Plants at Bellville, Saldanha, Cambridge and Swartkops Locomotive Depots

BELLVILLE LOCOMOTIVE DEPOT:

1. INTRODUCTION

This specification outlines the design, supply, construction, and commissioning of the upgraded Effluent Treatment Plant (ETP) at the Bellville Locomotive Depot. The system must be automated and integrated to allow for remote monitoring via computer or mobile devices. Alarms must automatically notify designated personnel of faults or abnormal conditions. Lighting must be installed for nighttime visibility, and all work must adhere to the applicable South African National Standards.

2. GENERAL REQUIREMENTS

- All electrical work must be done by qualified electricians and certified with a Certificate of Compliance (CoC).
- Site must remain tidy and be restored after completion.
- All materials must be new, of high quality, and appropriate for site conditions.
- Final installation must be capable of fully automated operation, with integrated alert/alarm systems.
- Allowance must be made for all design drawings and supporting documentation.

3. SCOPE OF WORK SUMMARY

3.1 Civil Works

- Seal 26m² of existing outer bund wall brickwork with cementitious waterproofing slurry.
- Disconnect and later reinstall existing electrical plug and housing box.
- Trace, expose, and relocate 2x main effluent inlet pipes to accommodate bund wall construction.
- Construct 100mm wide concrete outer skin bund wall (26m x 1m) with steel reinforcement and chamfered edges.
- Excavation and concrete footing for the bund wall.

3.2 Flow Meter Installation

- Cut into the existing steel pipe and install a new Elster Kent R1000 flow meter.
- Supply and install tamper-proof stainless-steel cabinet, powder-coated in orange, to house the meter.
- Complete with necessary couplings, adapters, and mounting to concrete base.

3.3 Oil Separator System (Pit No. 2)

• Remove and hand over the existing separator.

• Install new OS35 Ultra Spin Oil-Water Separator, rated for Class 1, Zone 2 hazardous zones.

• System must include:

- Automatic control and recycling function

- Debris strainer

- Diaphragm pump

- Float level and high/low water level controls

- Recycle valve

3.4 Oil Skimmer System (Pit No. 1)

• Install stainless steel SL-type oil skimmer to complement existing unit.

• Must include: - Flow capacity: 7m³/h (general water), 5m³/h (oily water)

- Oil-resistant suction hose kit (8m)

- UV-stabilized float kit with >80kg buoyancy

• Modify galvanized pipe to install t-piece and regulate ball valve.

3.5 Stainless Steel Pipework

• Remove ~11m of galvanized and PVC piping between JoJo tank and steel decant tank.

• Replace with 50mm stainless steel pipe and fittings.

• Include screw-type inspection cap near JoJo tank.

• Provide galvanized brackets and supports mounted on the new bund wall.

3.6 Roof Covering Over Oil Pits

• Design, supply and install roof structures over oil pits.

• Design to be approved and signed off by ECSA-registered structural engineer.

• Steel structure with IBR Chromadek roofing (0.53mm, Clean Colourbond AZ150 Charcoal).

• Span areas: - Pit 1: 7.5m x 3.5m

- Pits 2–5: 8.8m x 16.4m

• Roof height: 2.4m above ground level.

3.7 Electrical, Monitoring & Automation

• System must operate automatically and notify relevant personnel in case of issues.

• Installation of alarms, horns, and control units.

• System to allow remote monitoring via PC or mobile.

• All electrical work to comply with SANS 10142-1.

• All automation and alarms must be integrated with existing site systems.

3.8 Area Lighting

• Supply and installation of industrial-grade LED lighting to cover all working areas.

• Compliant with SANS 10114 for outdoor and industrial lighting.

3.9 Drawings and Documentation

• Contractor to provide: - All design drawings (civil, electrical, mechanical)

- O&M manuals

- As-built drawings

- Certificates of compliance and commissioning reports.

4. APPLICABLE STANDARDS AND REGULATIONS

• SANS 10142-1 – Electrical Installations of Buildings

• SANS 10222 – Security Fencing

• SANS 10400 – Building Regulations

• SANS 1700 / SANS 121 – Hot Dip Galvanizing

• SANS 10114 – Lighting Design Standards

• Occupational Health and Safety Act 85 of 1993

• National Water Act 36 of 1998

• NEMA Act 107 of 1998

• Local Municipal By-laws

SALDANHA LOCOMOTIVE DEPOT:

1. Background

Transnet Engineering has three Effluent Treatment Plant in the Ore Corridor, two in Saldanha and one in Sishen. The Effluent Treatment Plant at both locations is outdated and struggling to efficiently treat wastewater discharged from Locomotives Maintenance workshops.

Over time, the plant's components have deteriorated, leading to inconsistent treatment performance, frequent breakdowns, and challenges in meeting environmental discharge standards. The aging infrastructure is no longer capable of handling effluent treatment properly.

To restore the plant to full operational capacity, an upgrade or complete replacement of key components is necessary. The goal of this upgrade is to ensure compliance with environmental regulations, improve operational reliability, and future-proof the plant for growing industrial demands.

2. Scope of Work

The Scope of work applies to all one Effluent Treatment Plants.

2.1 Minimum Requirements

- Conduct a detailed site inspection to evaluate the current condition of the plant and its components.
- Identify key deficiencies in the existing system, including mechanical, electrical, and structural issues.

2.2 Mechanical, Electrical and Structural upgrades

- Replace and upgrade aging pumps, and filtration units with high-efficiency alternatives.
- Upgrade all electrical components that needs to be changed.
- Conduct structural modifications where necessary to accommodate new components and ensure plant durability.

2.3 Quality and Safety Compliance

- All works done must meet Transnet Engineering internal safety and quality standards to guarantee the integrity and reliability of the equipment.
- Compliance with applicable industry standards, including ISO, and SANS regulations, is mandatory to ensure that all processes meet the necessary safety and operational criteria.
- Ensure the upgraded plant adheres to national and local effluent discharge standards.

- Supply odor and noise control measures to minimize environmental impact.
- Conduct environmental impact assessments to confirm sustainability and compliance with regulations.

2.4 Performance Testing and Commissioning

- A certification proving safety, readiness for use, and compliance is needed before equipment can be put into service.
- Conduct thorough system testing to verify the performance and efficiency of the upgraded plant.

3. Site Inspection

- All prospective Tenderers must participate in a mandatory site inspection to become fully familiar with all relevant aspects.
- Arrangements for the site visit, including confirmation of the date and time, must be coordinated with the Transnet Engineering Project Manager.
- A site inspection certificate must be filled out and signed by the Project Manager on the day of the visit, and it must be submitted with the tender documents.

Location	**Quantity of Effluent Treatment Plant**
Saldanha Diesel Locomotive Workshop	1

4. Information Required

- Offers will not be evaluated unless complete information and adequate documentation are submitted during the tendering process, allowing Transnet Engineering's Technical Officers to thoroughly assess each technical proposal.
- Potential Tenderers must fully complete the relevant questionnaire and indicate whether their offer meets each specification item.
- If there isn't enough space to provide complete information, Tenderers should include the additional details in their cover letter, numbering them according to the corresponding clause in the specification.
- As prospective Tenderers are considered experts in their respective fields, they must identify any deficiencies, such as missing elements or inadequate requirements, in the specification. These issues should be communicated to Transnet Engineering during the tender stage, along with suggested alternatives. Each proposal must be priced separately.

5. Regulatory Requirements

5.1 Compliance

- All equipment and work done must meet the relevant SANS standards, whether mentioned in this specification or not. If SANS standards are not available, compliance with British Standards is acceptable.
- International Standards (e.g., ISO 14001, WHO standards)
- Environmental Impact (e.g., air emissions, sludge handling, chemical disposal)

5.2 Occupational Health and Safety Act (OHSA)

- The following regulations and codes must be complied with: - at all times.
- Adherence to the Occupational Health and Safety Act, Act 85 of 1993, is mandatory. This includes ensuring a safe work environment and mitigating health risks.
- The contractor is responsible for the safety of everyone on the site and for the equipment at all times during installation.
- All tenderers must understand the installation environment. It is required that all personnel involved in this contract, including subcontractors, attend a safety induction course.
- The successful contractor must conduct a risk assessment to identify potential risks associated with the project. This assessment must be submitted to the risk department through the project manager at least two weeks before the project starts. A safety file and related documents will be required from the successful tenderer, as specified by the risk department.
- Contractor employees must always follow Transnet Engineering's security and safety procedures.
- Appropriate personal protective equipment (PPE) must always be used.

1. Specific Requirements

Contractors shall complete the following information by writing "Comply" where she/he meets the specification or give a brief description where his/her offer differs.

Item No:	Required	Comply Yes/No
6.1	**Scope of Works:**	
6.1.1	**Civil Works** • Repair and refurbish damaged pits and containment structures. • Replace or rehabilitate deteriorated piping and associated infrastructure. • Conduct necessary structural repairs to ensure integrity and longevity. **Mechanical Works**	

	• Remove and replace pumps with new, high-efficiency models suitable for effluent treatment operations. • Clean and service filters to improve performance and extend lifespan. • Provide and install required spare parts for mechanical components. **Electrical and Control System Upgrades** • Replace outdated or faulty electrical switchgear and control systems. • Upgrade control panels and associated wiring to meet current standards. • Ensure all installations comply with regulatory and safety requirements. **Cleaning and Commissioning** • Empty and clean effluent pits to facilitate maintenance and repairs. • Conduct thorough testing and commissioning of all installed components to confirm functionality. • Provide operational verification and handover documentation. **Spare Parts and Consumables** • Supply a set of essential spare parts for pumps, filters, and electrical components to facilitate future maintenance. **Site Visit** • A **compulsory site visit** will be scheduled for all bidders to inspect the existing conditions and obtain detailed specifications before finalizing bids. **Deliverables** • Completion of all specified repairs and replacements. • Testing and commissioning reports confirming proper functionality. • Supply of spare parts as listed in the final agreement.	
6.2	**Contractors Responsibilities:**	
6.2.1	• Procuring all necessary materials and equipment required for the upgrade. • Ensuring all work complies with industry standards, safety regulations, and best practices. • Coordinating with relevant authorities for inspections and approvals. • Providing progress reports to Transnet Engineering project management team at agreed intervals. • Ensuring minimal disruption to ongoing operations during installation and testing phases. • Disposing of any waste materials generated during the upgrade in accordance with environmental regulations.	

	• Submitting as-built drawings and technical documentation upon project completion.	

CAMBRIDGE LOCOMOTIVE DEPOT

1. INTRODUCTION

This specification covers the design, supply, construction, automation, testing, and commissioning of upgraded effluent treatment plant components for the Cambridge Locomotive Depot in Uitenhage. The plant must be designed for 20 years of service life and adhere to sound engineering principles, regulatory compliance, and environmental responsibility.

2. SCOPE OF WORK SUMMARY

The contractor shall provide a complete turnkey solution for the upgrade of the effluent plant, which includes but is not limited to:

2.1. Civil Works

- Preparation of site including clearing, leveling, and grading.
- Construction of concrete bund walls and slabs for Polymer Water Storage Tank installations.
- Erection of shade structures with subframes.

2.2. Mechanical & Process Installations

- Installation of two 20,000L Polymer Water Storage Tank with fittings and transfer motor.
- Supply and installation of 2000L oil storage tank (plastic).
- Replacement of the existing oil separator with a stainless-steel version complete with hoses, clamps, debris strainer.
- Replacement of current belt skimmers with more efficient , newer type skimming technologies.
- Installation of totalization meters for both sewer and effluent lines.
- Supply and installation of new effluent pumps where required as per system design.
- Automatic level sensor system for pump activation and overflow prevention.

2.3. Electrical and Automation Systems

- Supply and installation of new Industrial Orange Metal DB board compliant with SANS 10142.
- Main switch with surge protection (no earth leakage).
- Complete labelling and layout diagrams as per Transnet Engineering standards.
- Certificate of Compliance (CoC) for new installation.

- Integration into PLC system for automatic operation.
- Remote access capability (PC & mobile).
- System to automatically raise alarms and send notifications to designated personnel upon fault detection.
- Siren or horn notification system.
- Supply and installation of an uninterruptible power supply (UPS) for essential controls.

2.4. Security and Site Enhancements

- Supply and install **2.4m high ClearVu or similar high-security fencing** around 70-meter perimeter.
- **Two lockable access gates** (Pedestrian)
- Site lighting is suitable for security and nighttime operation.
- This must High Mast Mounted – 6m
- Pole must be Galvanized steel

2.5. Documentation and Handover

- Operating and maintenance manuals (x3).
- Electrical schematics and hydraulic diagrams.
- Commissioning certificate and testing report.
- Staff training on plant operation and safety protocols.

3. STANDARDS AND REGULATIONS

All work shall comply with the following:

- **Occupational Health and Safety Act 85 of 1993.**
- **SANS 10142-1** – Electrical Installations of Premises.
- **SANS 10222** – Security Fencing.
- **SANS 10400** – Building Regulations.
- **SANS 60335** – Electrical Equipment Safety.
- **NEMA Act 107 of 1998.**
- **National Water Act 36 of 1998.**
- **Water Services Act 108 of 1997.**
- Municipal By-laws and local environmental standards.

SWARTKOPS LOCOMOTIVE DEPOT

1. Overview

This document outlines the scope of work for the upgrade of the existing effluent treatment plant at the Swartkops Locomotive Depot. The objective is to modernize and expand the facility to efficiently manage and treat effluent generated during the maintenance of locomotives. The treated effluent, along with raw sewage, will be pumped to the nearest municipal wastewater treatment works.

2. Scope of Work

2.1. Civil and Structural Works

- Site clearance and preparation.
- Construction of new concrete plinths and bund walls where required.
- Installation of a 2.4-meter-high perimeter ClearVu fence or similar approved, complete with two (2) lockable access gates.
- Provision of adequate stormwater drainage.

2.2. Mechanical and Process Works

- Upgrade of existing 3 effluent pumps and 2 sewage pumps with energy-efficient and corrosion-resistant models.
- Installation of pump isolation valves, backflow preventers, and non-return valves.
- Installation of flow meters, chemical dosing pumps, and surge protection.
- Supply and installation of additional sludge and grease traps, if required.

2.3. Electrical and Instrumentation

- Replacement/upgrade of electrical motor control centres (MCCs).
- Installation of programmable logic controllers (PLCs) for automated process control.
- Integration of system status indicators and alarms.
- Supply and installation of an uninterruptible power supply (UPS) for essential controls.

2.4. Automation and Monitoring

• Integration of a SCADA (Supervisory Control and Data Acquisition) system with remote monitoring capability via PC and mobile devices.
• Alarms to notify responsible personnel in the event of system faults, failures, or irregular parameters.
• Data logging and reporting features.

2.5. Lighting and Security

• Supply and installation of energy-efficient LED floodlights around the perimeter and operational zones.

• Lighting poles and underground cabling as required.

3. Applicable Standards

• SANS 10252-2: Water Supply and Drainage for Buildings - Part 2: Drainage Installations
• SANS 10400: Building Regulations
• SANS 10103: The Measurement and Rating of Environmental Noise
• SANS 241: Drinking Water Specification (as applicable for treated effluent quality monitoring)
• Occupational Health and Safety Act 85 of 1993
• Electrical Installation Regulations (as per Department of Labor)
• ISO 14001: Environmental Management Systems
• NEMA Act 107 of 1998.
• National Water Act 36 of 1998.
• Water Services Act 108 of 1997.
• Municipal By-laws and local environmental standards.

Part C4: Site Information

1. BACKGROUND

a) The **Transnet Engineering Locomotive Depots** are located at:

I. Bellville Locomotive Depot, Off Robert Sobukwe Road, Bellville, Cape Town
II. Saldanha Locomotive Depot, Orex Road, Saldanha, Cape Town
III. Cambridge Locomotive Depot, Western Avenue Ocean View, East London
IV. Swartkops Locomotive Depot

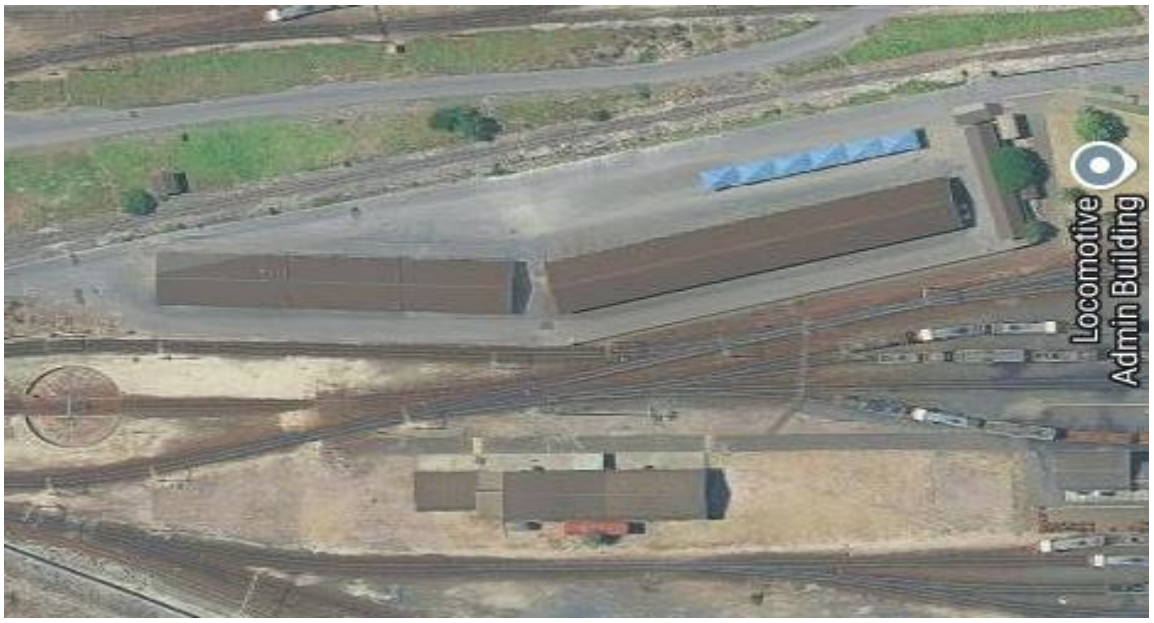

Figure 1: Bellville Locomotive Depot Overview

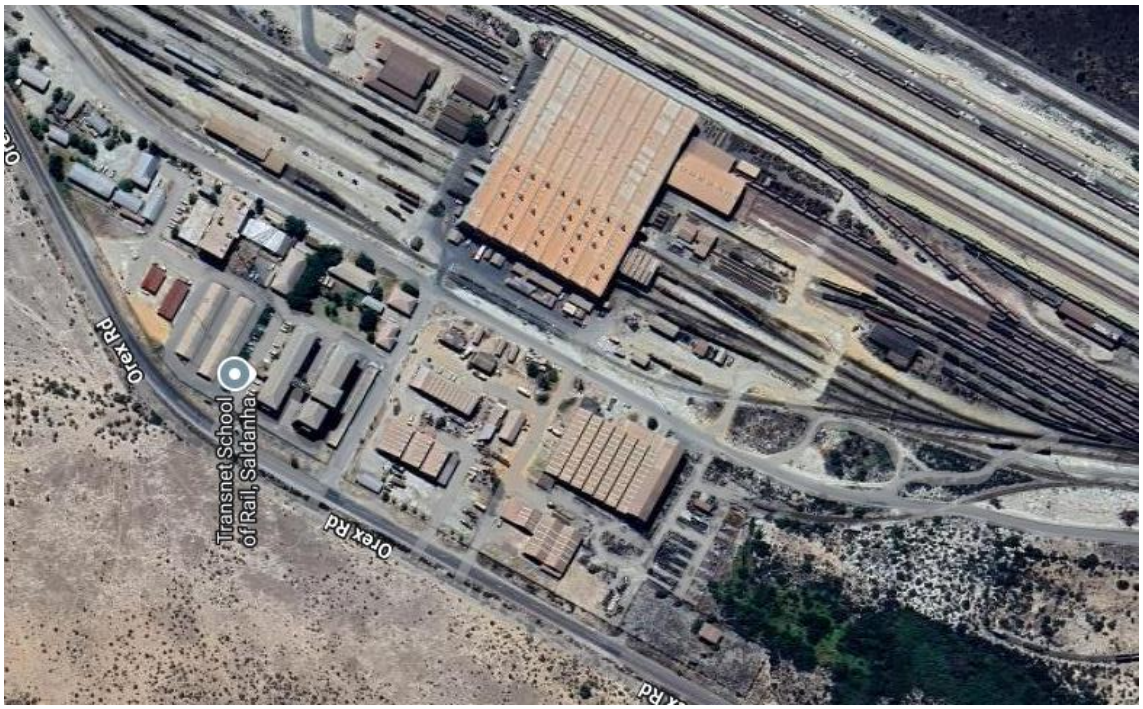

Figure 2: Saldanha Locomotive Depot Overview

Figure 3: Cambridge Locomotive Depot Overview

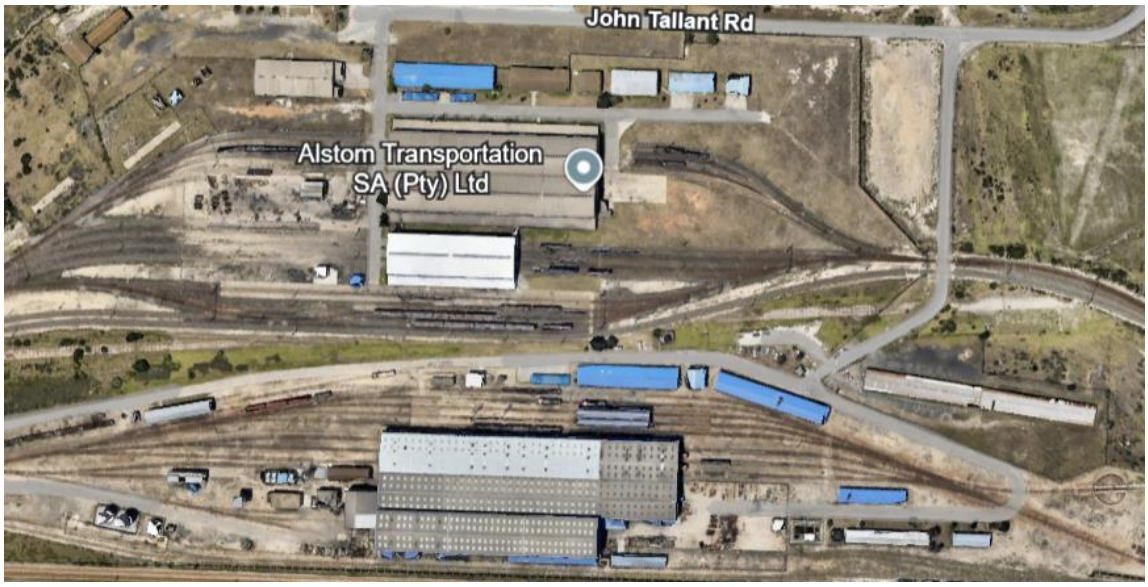

Figure 4: Swartkops Locomotive Depot Overview

2. ACCESS

2.1. Access Limitations

a) Access to the depot and surrounding worksites is limited to the working hours of 07h00am to 16h00pm Monday to Friday. Access may be granted on weekends upon special request.

2.2. Access Control

a) The depots are accessed via the indicated address above

2.3. Requirements for Access

a) The dock is an active industrial site and can only be accessed with recommended PPE including:

- Hard Hat
- Steel toe Boots, and
- Reflective Work Suits/Vests