



**MINING INDUSTRY
OCCUPATIONAL
SAFETY & HEALTH**



**MINERALS COUNCIL
SOUTH AFRICA**

TRAFFIC MANAGEMENT LEADING PRACTICE FOR OPEN PIT/CAST MINES

A GREENFIELDS SUCCESS STORY



BACKGROUND

West Wits Mining, operating in South Africa's Witwatersrand Basin, launched the Qala Shallows Project as a greenfield initiative to produce gold from previously mined reefs. Recognising that 80% of trackless mobile machinery (TMM) related incidents in the South African mining industry are due to inadequate traffic management, they made a bold, proactive decision to utilise the MOSH Traffic Management Leading Practice for Surface Operations (TMLP) from day one to address collision risks. West Wits Mining therefore registered to adopt the MOSH TMLP to enhance both their surface and underground safety standards before full production commenced.

In July 2023, West Wits Mining completed an updated Definitive Feasibility Study (DFS) for Qala Shallows (Stage 1 on the Kimberley Reef), marking a significant milestone in the redevelopment of a historically mined area. Mining activity in this region occurred in the past, but was later mothballed due to economic and operational challenges. The updated DFS was prompted by progress in infrastructure installation, updated underground survey data, contractor agreements, and adjustments for market-based cost escalations. As part of an Early Works program, the decline shaft was successfully renovated, restoring access to the ore body. In addition, a toll processing agreement was secured with Sibanye-Stillwater, further de-risking the project's development and operational pathway.

This case study chronicles the Qala Shallows Project journey of embedding safety through design, systems, and culture, setting a new benchmark in mining traffic safety for both surface and underground operations.

OVERVIEW

- A** **Mining Company:** West Wits Mining
- B** **Commodity:** Gold
- C** **Health and Safety Case Study:** Application of the MOSH Traffic Management Leading Practice for Surface mines in a greenfield operation
- D** **Operation/Mine:** Qala Shallows
- E** **Stakeholders Consulted:** Mine Management
- F** **Occupations affected benefited:** All mine personnel

FULL DESCRIPTION OF THE RISK ADDRESSED

West Wits Mining, situated in the heart of South Africa's renowned Witwatersrand Basin, is proud to become the first greenfield mining project to adopt and embed the MOSH Traffic Management Leading Practice principles for both surface and underground mining operations at the inception of its operations.

Whilst West Wits Mining adheres to all applicable legislative requirements governing the operation and use of TMM, the company proactively adopted the MOSH Traffic Management Leading Practice for Surface Operations to enhance and embed world-class safety standards from the outset of its greenfield development, rather than waiting to retrofit improvements later during operations.

The following controls, which are higher on the hierarchy of controls, were incorporated in the traffic management design:

Physical Separation of Pedestrians and Machinery

Separation controls are highly effective in managing interaction risks. Constructing separating barriers, establishing dedicated pedestrian routes with the involvement of employees, and using reverse parking with designated pedestrian walking areas will significantly improve safe movement.

One Way Directional Traffic

One-way directional road systems will be introduced at critical high-traffic zones such as the fuel refilling station, stores, parking areas, and brake testing areas to avoid the interaction of oncoming vehicles and to reduce congestion.

Signage

Clear and standardised signage will be strategically installed to guide vehicle and pedestrian movement, reinforce road rules, and ensure safe navigation throughout the site.

Brake Test Ramp

Brake testing facilities will be designed to comply with MOSH Traffic Management adoption guidelines, ensuring that vehicles are systematically assessed before entering active traffic zones.

The physical and visual control measures will directly address some of the highest-risk interactions in the mining environment and will contribute significantly to reducing potential vehicle-to-vehicle and vehicle-to-pedestrian incidents.



Figure 1: Aerial view of Qala Shallows



Figure 2: Qala Shallows Surface Block Plan

PROJECT PHASES

PHASE 1:

Foundation Through Feasibility

In July 2023, the Definitive Feasibility Study (DFS) for Qala Shallows was finalized. Early infrastructure development and shaft rehabilitation provided an opportunity to integrate the TMLP before the start of production.

Using the MOSH Elements of the Traffic Management Leading Practice Guideline, the following will be built into the design:

- Physical separation measures such as berms, barriers, and reverse parking;
- Controlled access through hard parks, signage, and collision prevention technology like Proximity Detection Systems (PDS); and
- Stakeholder consultations to localize routes and rules.



Figure 3: Bulk diesel, oil, and water delivery route

DESIGN WITH DISCIPLINE

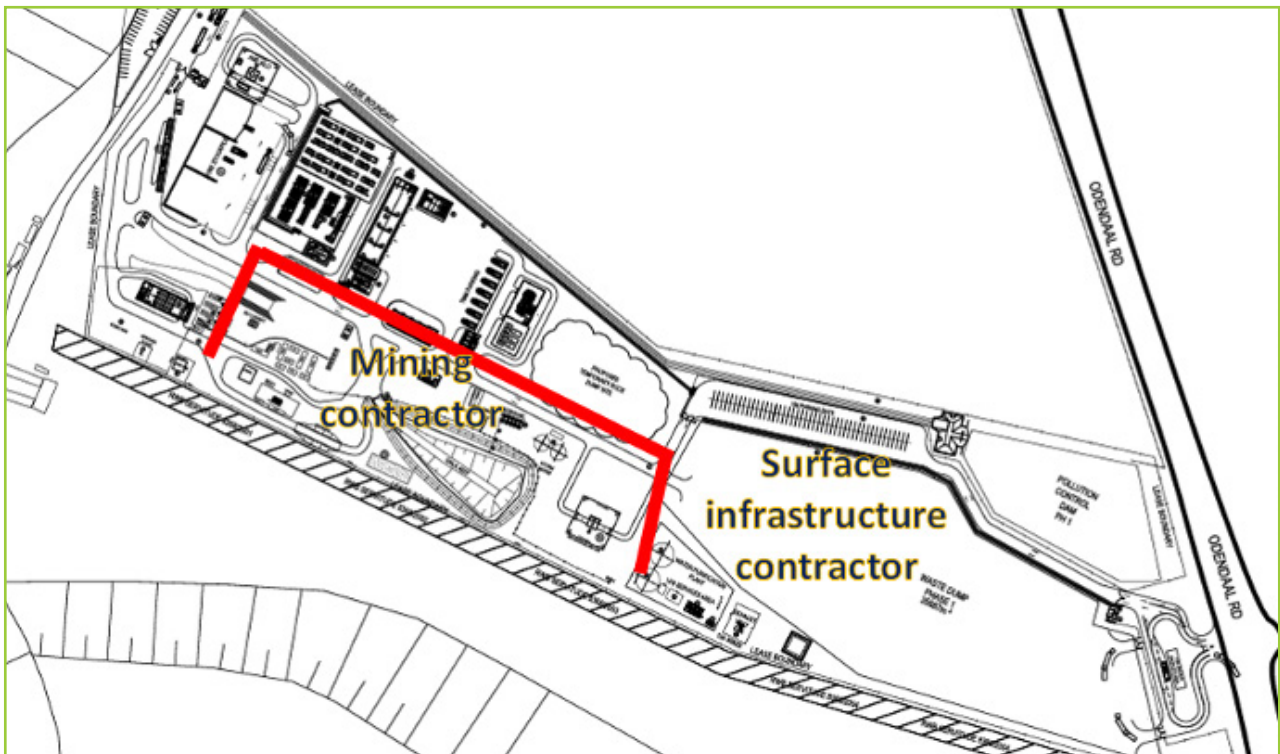
PHASE 2:

Foundation Through Feasibility

Construction of surface infrastructure commenced with all contractors undergoing the induction and TMLP training.

Traffic routes were defined, risks analyzed, and zones clearly demarcated with signage and fencing. Key tools included:

- Visual traffic flow plans
- Pre/post assessments for traffic rule understanding
- Consideration of Collision Prevention System (CPS)



■ **Figure 4:** Construction of mining and surface infrastructure layout

THE WEST WITS MINING TRAFFIC MANAGEMENT STRATEGY WAS DEVELOPED USING A SYSTEMATIC APPROACH

The Traffic Flow and Risk Analysis process follows a structured sequence of key steps to ensure effective hazard identification and mitigation. It begins with a Traffic Flow Analysis, where vehicle and pedestrian movement across the site is mapped and understood in detail. This is followed by a Traffic Management Risk Assessment (RA), which focuses specifically on traffic-related hazards within the operational context. The next step involves identifying all potential unwanted events, any foreseeable incidents or disruptions that could pose a safety risk. Once these events are identified, the process shifts to determining all potential

controls, including engineering, procedural, and behavioral interventions to prevent such occurrences. Finally, a Control Effectiveness Analysis is conducted to assess whether the identified controls will adequately and reliably mitigate the associated risks.

To ensure comprehensive protection, the above process subscribes to the **Hierarchy of Controls**, a structured framework used to determine the most effective safety interventions. The controls are applied in order of effectiveness from most (Elimination) to least preferred (PPE).



Figure 6: Traffic Management Risk Analysis Process

HIERARCHY OF CONTROLS

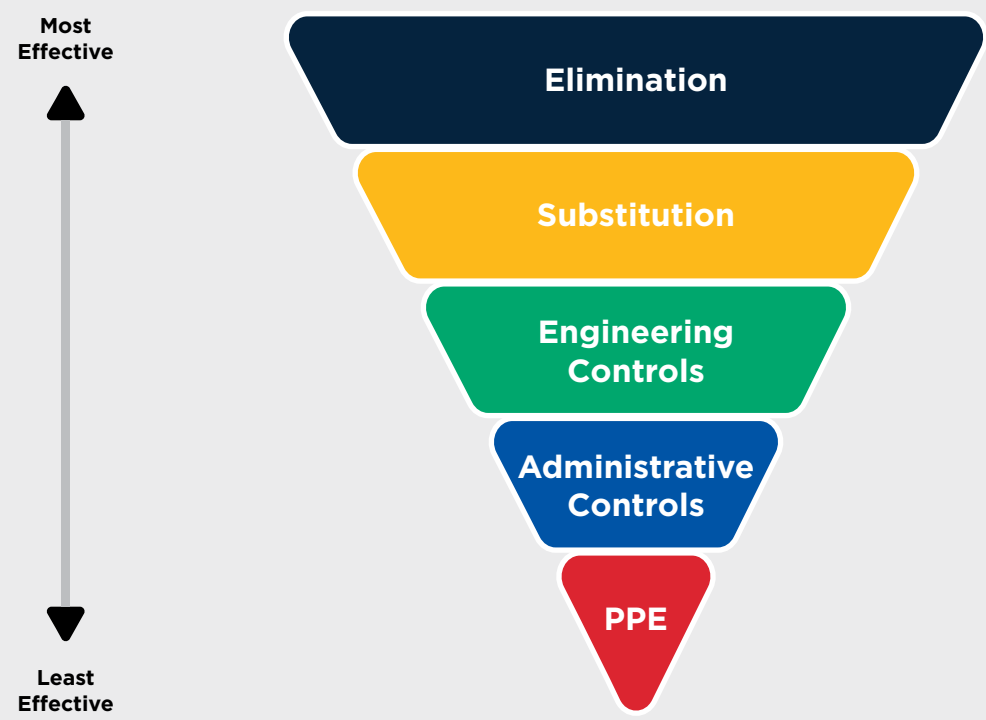


Figure 7: Hierarchy of control for traffic management

EXAMPLE OF SIGNAGE

SITE SAFETY



Hard hat
must be worn



Protective
footwear
must be worn



High visibility
jackets
must be worn



Ear protectors
must be worn



Warning
Construction site



Keep out



Danger
Demolition work
in progress



No admittance for
unauthorised personnel



**Site safety
starts here**



Pedestrians



**Site
Entrance**

DANGER

**HEAVY EQUIPMENT
CROSSING**



CHALLENGES FACED

1

Legacy Layout Constraints

Reworking historical mining infrastructure to align with modern traffic management standards required an innovative redesign.

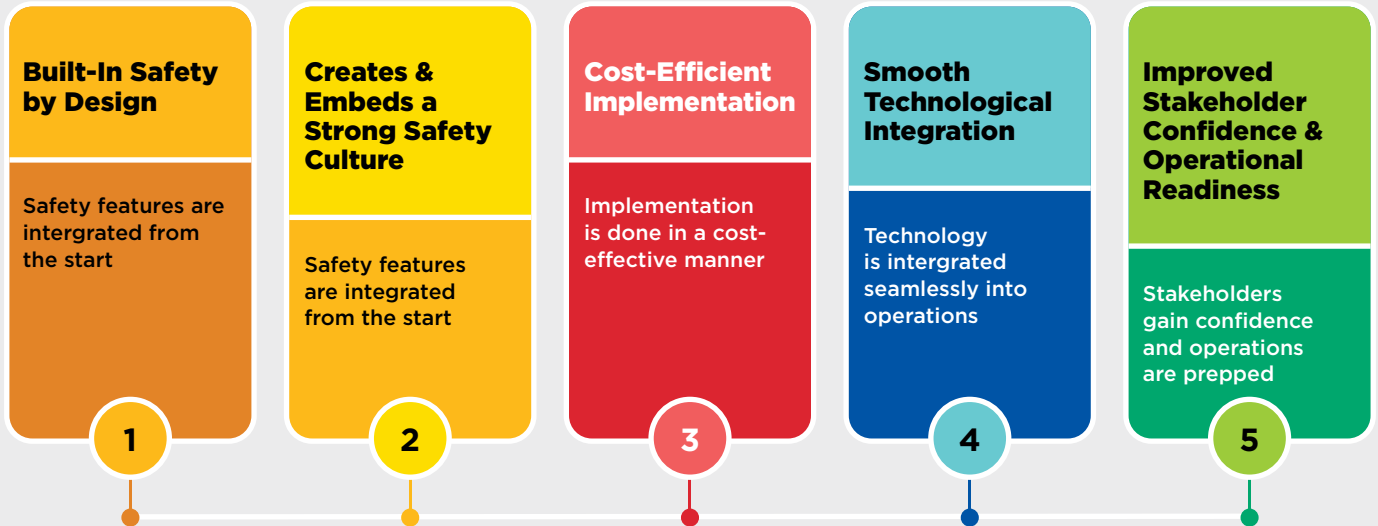
2

Lack of In-House Workforce (Yet)

With no permanent employees on site yet, stakeholder engagement was limited to contractors and management.

TOP 5 BENEFITS OF EARLY ADOPTION OF MOSH TMLP IN A GREENFIELD MINE

Benefits of Early MOSH TMLP Adoption



Built-In Safety by Design

Safety is integrated from the outset. Roads, walkways, intersections, and signage are designed to prevent vehicle-pedestrian interaction. This eliminates the need for expensive redesigns or retrofits later.

Creation and Embedding of a Strong Safety Culture

Starting with TMLP sets a behavioural and cultural foundation for safety. Once employees are trained and onboarded, safety becomes part of “how things are done” rather than a rule to follow later.

Cost-Efficient Implementation

Proactive planning avoids costs associated with infrastructure modifications, staff retraining, and incident management resulting from poor traffic control.

Smooth Technological Integration

The mine is designed to support modern safety systems from day one, including CPS, traffic signage, controlled access, and digital tracking.

Improved Stakeholder Confidence and Operational Readiness

Early adoption demonstrates a commitment to world-class standards, which builds trust with regulators, contractors, future employees, and investors while setting the stage for safe, efficient production.

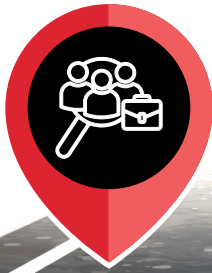
STAKEHOLDER ENGAGEMENT

Current Implementation Context

West Wits Mining is still in the pre-operational phase of the Qala Shallows project. At this stage:

- Only contractors are present on-site, executing early infrastructure works in preparation for mine reopening.
- Permanent employees have not yet been recruited; therefore, employee-specific engagement and input into the Traffic Management Plan have not yet taken place.

- Once employees are on board, formal stakeholder engagement sessions will be conducted. This process will gather employee input on:
 - o Pedestrian walkway routes,
 - o Additional signage placement,
 - o Enhanced communication on right-of-way rules.
- Induction and training on the full Traffic Management Plan will be completed before the commencement of any work by employees to ensure full alignment with MOSH Leading Practices.



Recruit and Onboard Employees

Hiring and integrating new staff with a focus on traffic management awareness.



Engage in Traffic Management

Involving employees in finalising the traffic management plan, especially for pedestrian movement and signage.



Conduct Training and Induction

Providing comprehensive training using real site visuals and interactive methods.



Establish Feedback Loop

Creating a continuous feedback system between safety teams and the workforce for ongoing improvement.

FINDINGS AND LESSONS LEARNED FROM THE ADOPTION OF THE PRACTICE OR IMPLEMENTATION OF THE COMPANY BEST PRACTICE



EARLY INTEGRATION OF SAFETY INTO DESIGN

At West Wits Mining, early adoption of the MOSH Traffic Management Leading Practice provided critical insights into proactively managing traffic risks associated with TMM operations on both surface and underground. Implementing safety controls from the greenfield phase offered unique opportunities and challenges, yielding valuable lessons that can inform future projects and mining operations across the sector.

One of the most important lessons was the value of integrating traffic management principles during the initial mine design phase. By embedding safety into the mine layout, including traffic flow, pedestrian separation, and hard park areas, West Wits avoided possible costly retrofitting and disruptions later in the project. This proactive planning created an inherently safer operational environment and improved efficiency from the onset.



GOING BEYOND COMPLIANCE

West Wits Mining learned that merely complying with legislative requirements is not sufficient to achieve industry-leading safety standards. Although the company adhered to all relevant legislation governing TMMs, applying the MOSH Traffic Management Leading Practice for Surface Operations provided an elevated framework that enhanced resilience, reduced risk exposure, and created a more proactive safety culture.



DYNAMIC AND ONGOING TRAFFIC MANAGEMENT PLANNING

The evolving nature of the site during development and ramp-up required that traffic management planning be dynamic and continuously updated. As the operation expanded, new risks and interaction points emerged. Regular site risk assessments, traffic flow analyses, and real-time data monitoring were critical to ensure that traffic management remained relevant and effective throughout all stages of the operation.

CONCLUSION

The West Wits Mining experience has shown that implementing the MOSH Traffic Management Leading Practice for Surface Operations from the earliest stages of mine development results in significantly safer, more resilient, and more efficient operations.

By taking an active role not only in writing the initial procedures, but also in designing the roads in line with established leading practices and regulatory requirements, it became easier to embed a strong safety culture and create a genuine sense of ownership among all stakeholders. This proactive, integrated approach – combining people, processes, physical controls, technology, and leadership – has proven essential to building a sustainable, effective traffic safety management system. The experience underscores that when best practices are embraced from the beginning, they are not seen as external requirements but become part of the mine’s very DNA, setting the foundation for long-term success.