Mined Innovation Challenge

Better Built Belts

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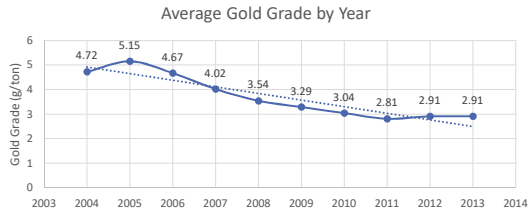
Case Study Background

Today's Problem

- Lower grade deposits
- Deposits found at greater depths
- Industry focus on reducing dependence on diesel equipment

SA Annual Average Gold Grade



Case Parameters

- Underground long-hole stope
- 1000 t/d ***active*** stope production
- 300 t/d ***average*** stope production

Areas of Focus

- Equipment Fleet Logistics
- Cycle times
- Mine Scheduling

Case Study Background | Design Concept | How it Works | Major Considerations | Summary

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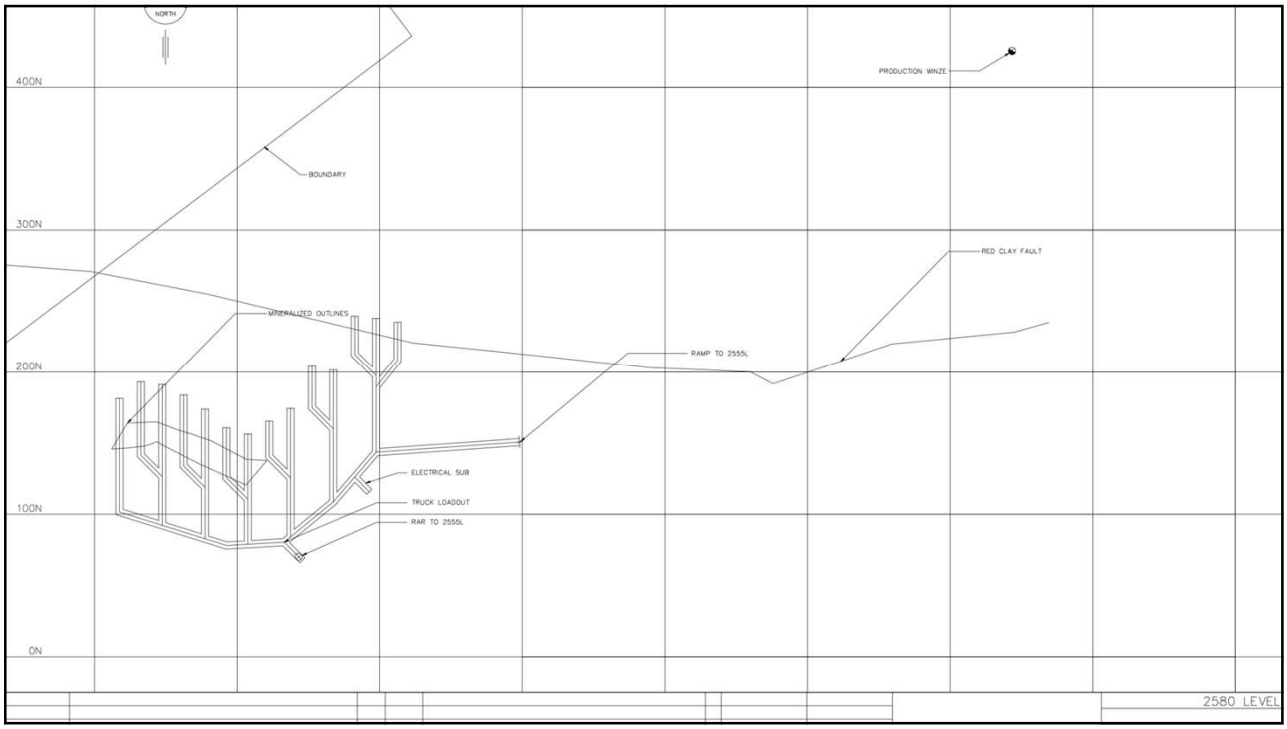
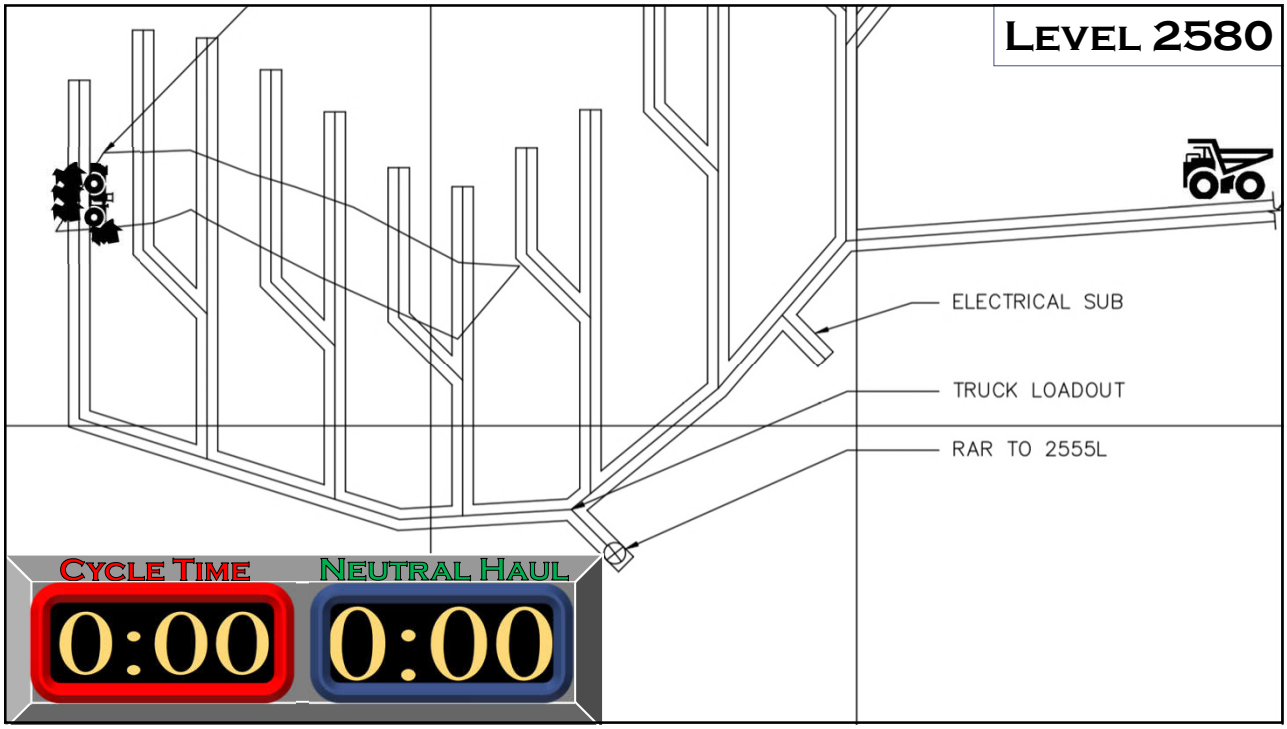
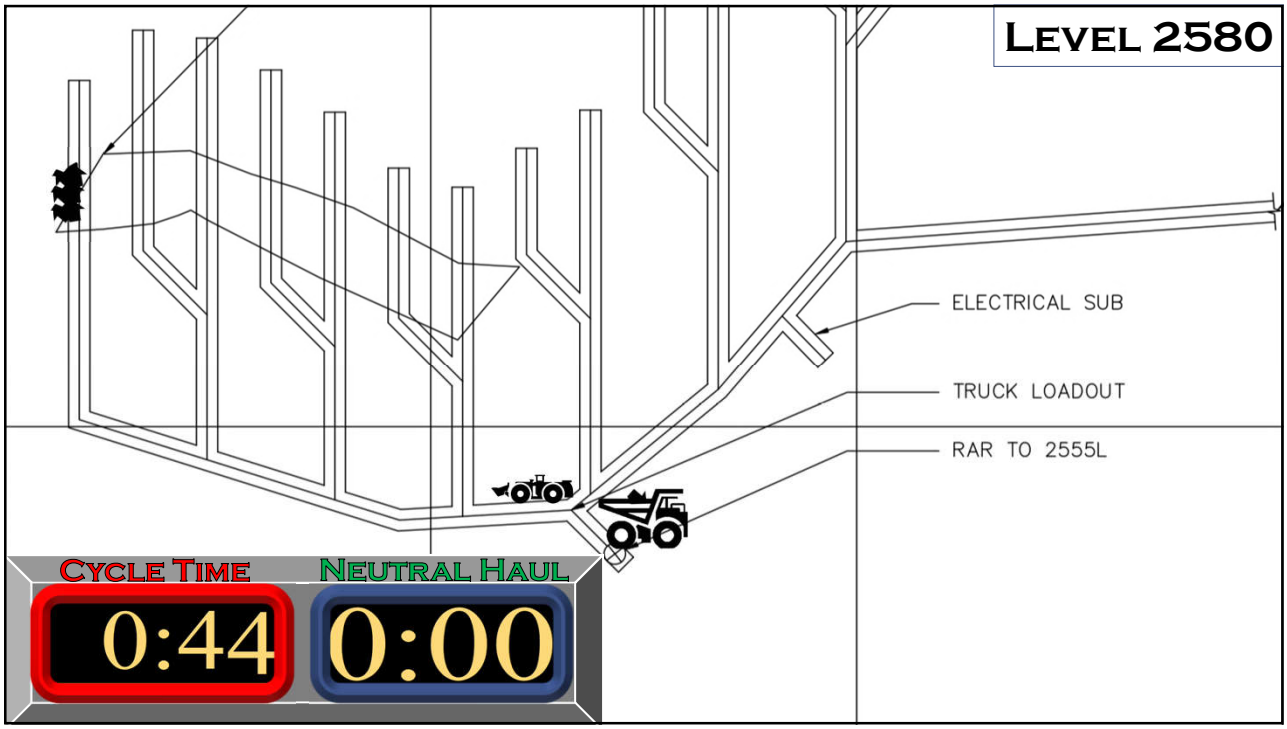
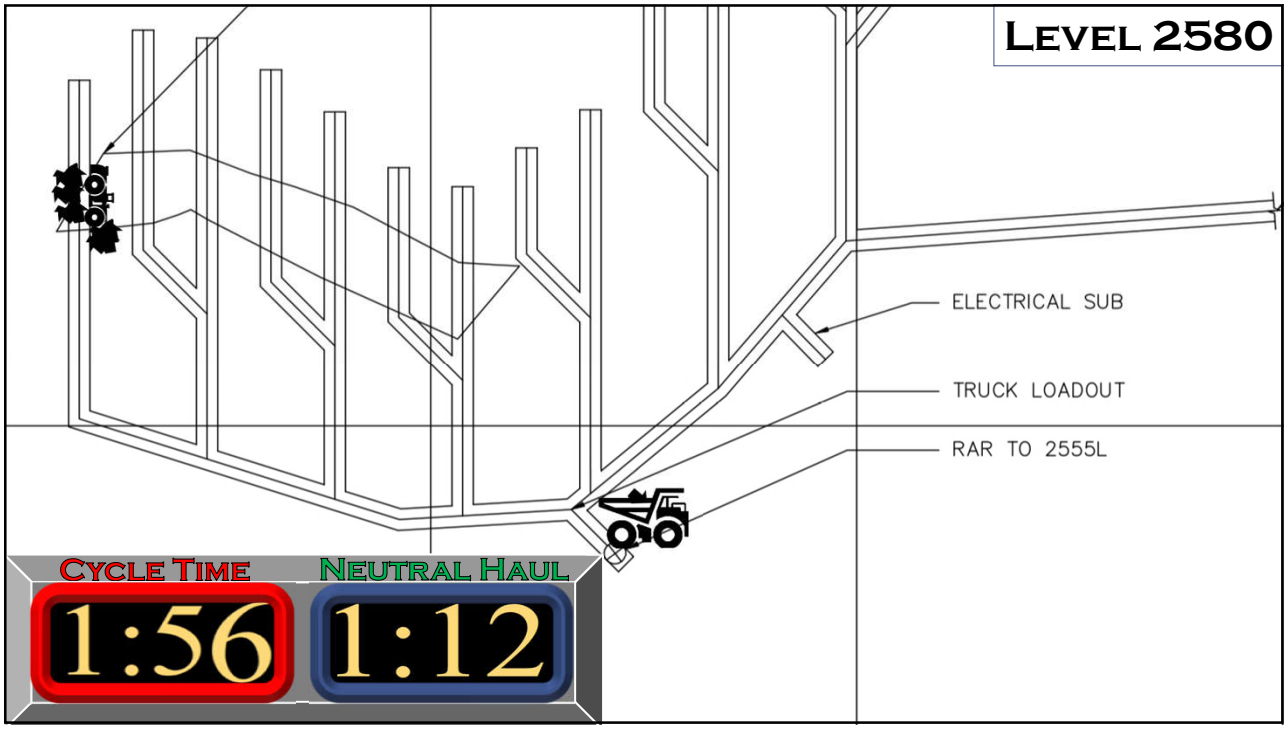
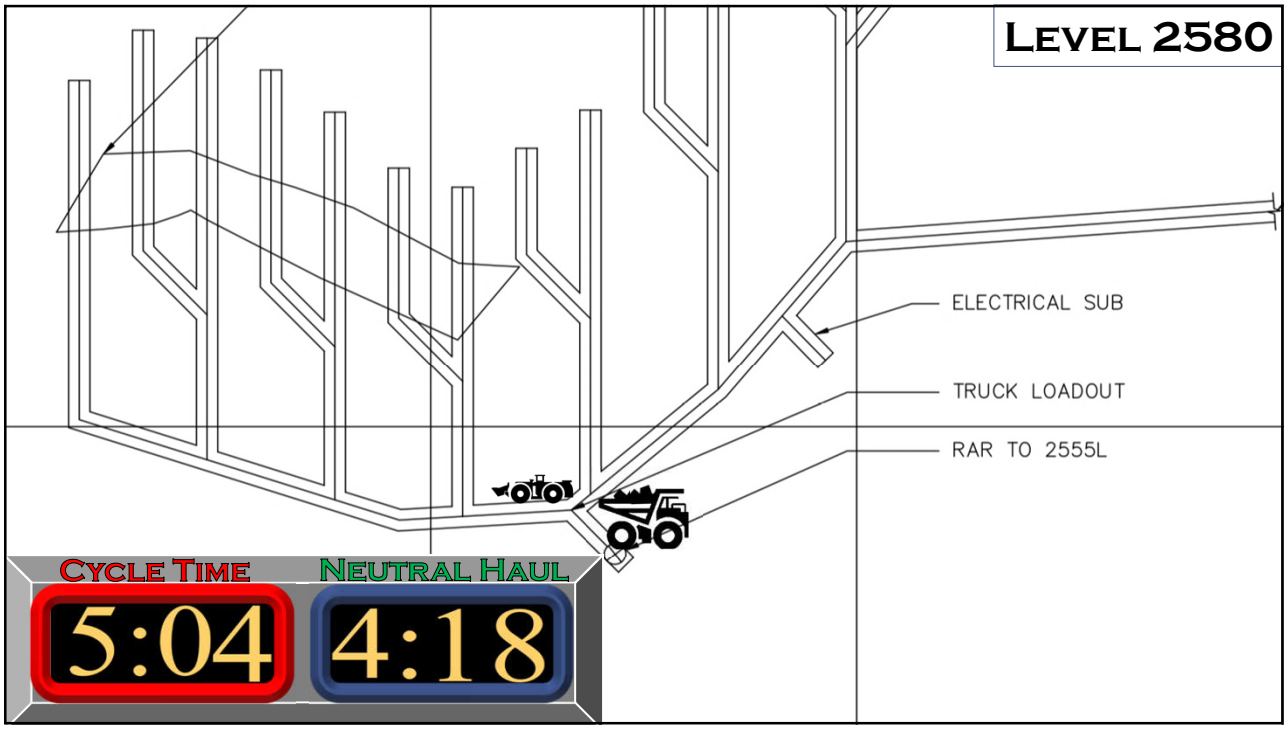
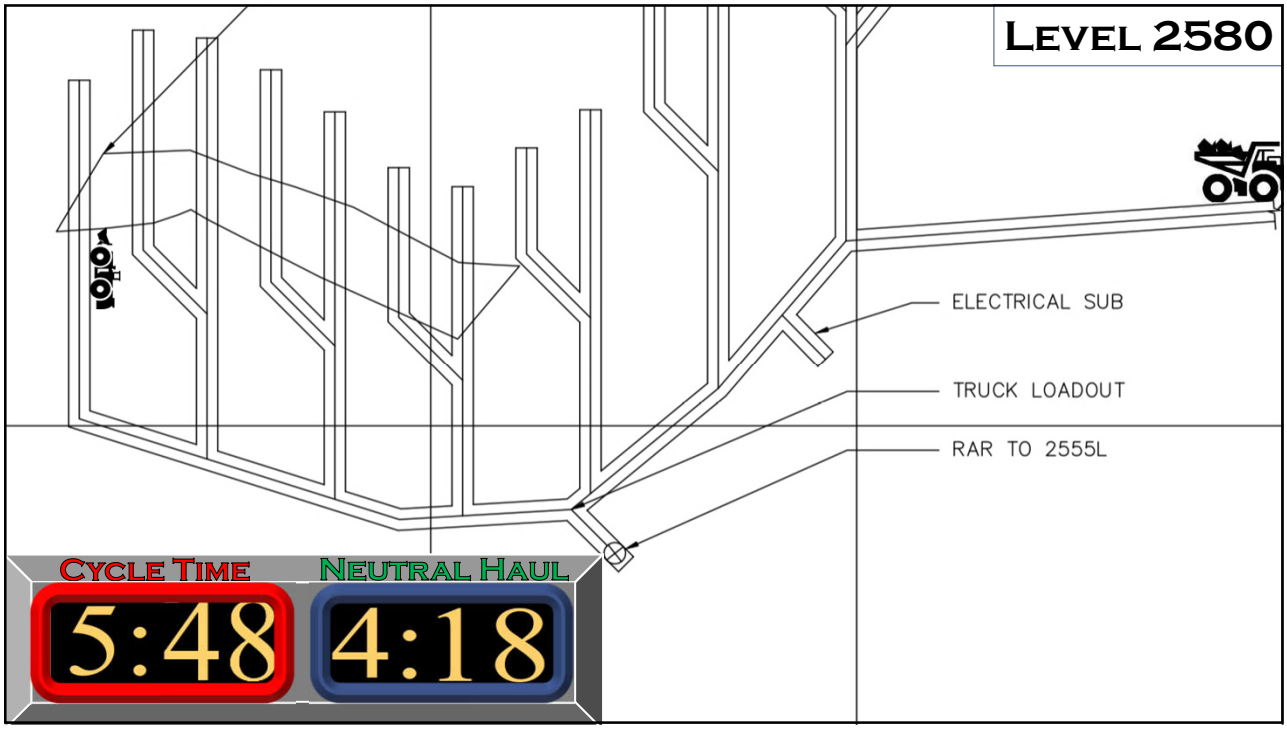

NORTH
400N
300N
200N
100N
0N
PRODUCTION WINZE
BOUNDARY
RED CLAY FAULT
MINERALIZED OUTLINES
RAMP TO 2555L
ELECTRICAL SUB
TRUCK LOADOUT
RAR TO 2555L
2580 LEVEL


LEVEL 2580
ELECTRICAL SUB
TRUCK LOADOUT
RAR TO 2555L
CYCLE TIME
NEUTRAL HAUL
0:00
0:00


LEVEL 2580
ELECTRICAL SUB
TRUCK LOADOUT
RAR TO 2555L
CYCLE TIME
NEUTRAL HAUL
0:44
0:00


LEVEL 2580
ELECTRICAL SUB
TRUCK LOADOUT
RAR TO 2555L
CYCLE TIME
NEUTRAL HAUL
1:56
1:12


LEVEL 2580
ELECTRICAL SUB
TRUCK LOADOUT
RAR TO 2555L
CYCLE TIME
NEUTRAL HAUL
5:04
4:18

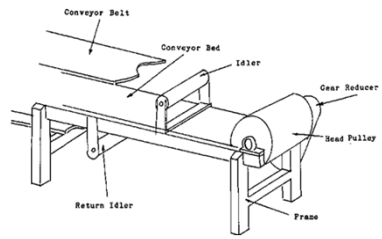

LEVEL 2580
ELECTRICAL SUB
TRUCK LOADOUT
RAR TO 2555L
CYCLE TIME
NEUTRAL HAUL
5:48
4:18

Design Concept

Construable Conveyor Belt System

- Composed of 5m long pieces
- Built with thick rubber
- 2 Part connecting system
  - Primary: Ergonomic Linkages
  - Secondary: Electromagnetic

Standard Conveyor System



Brief Overview

- Quick installation / takedown
- Reduces an entire leg of the cycle
- Reduced cycle times lead to increased production rate

Conveyor Benefits

- Reduced u.g. vehicle traffic
- Eliminates time wasted in returning empty trucks
- Currently well utilized in mining for open pit methods

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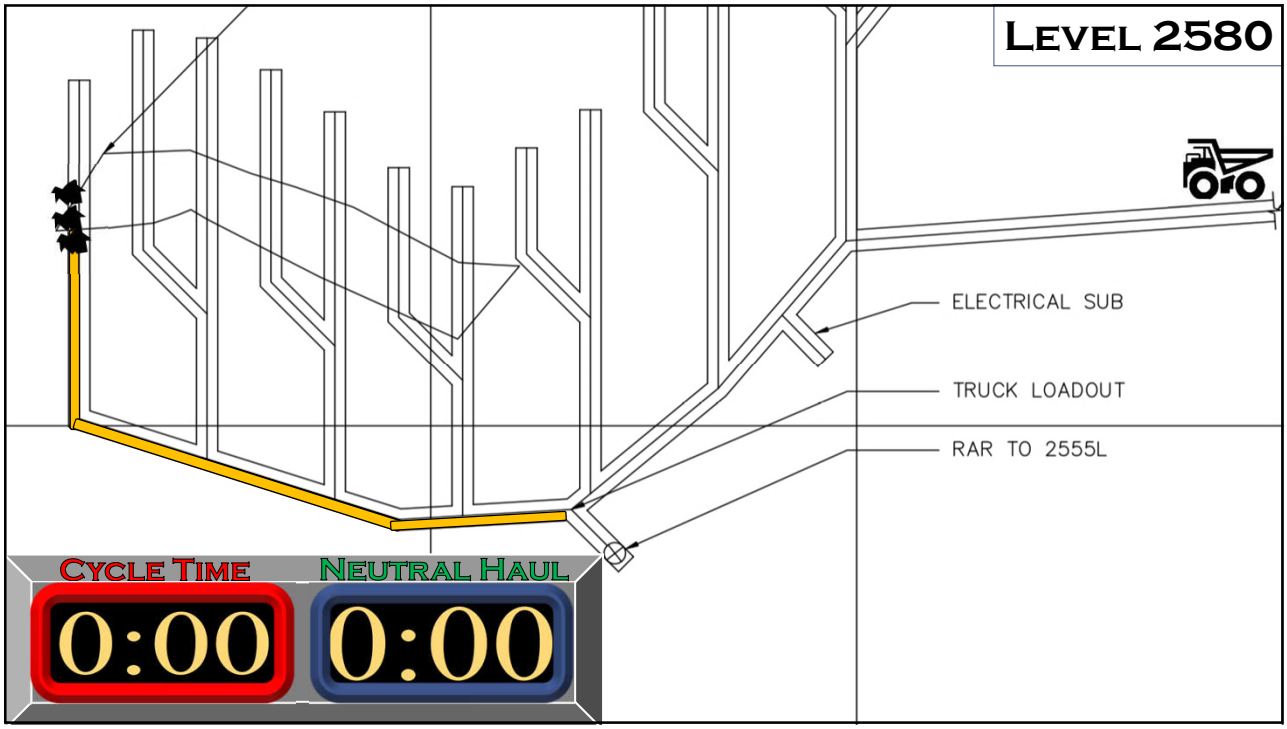

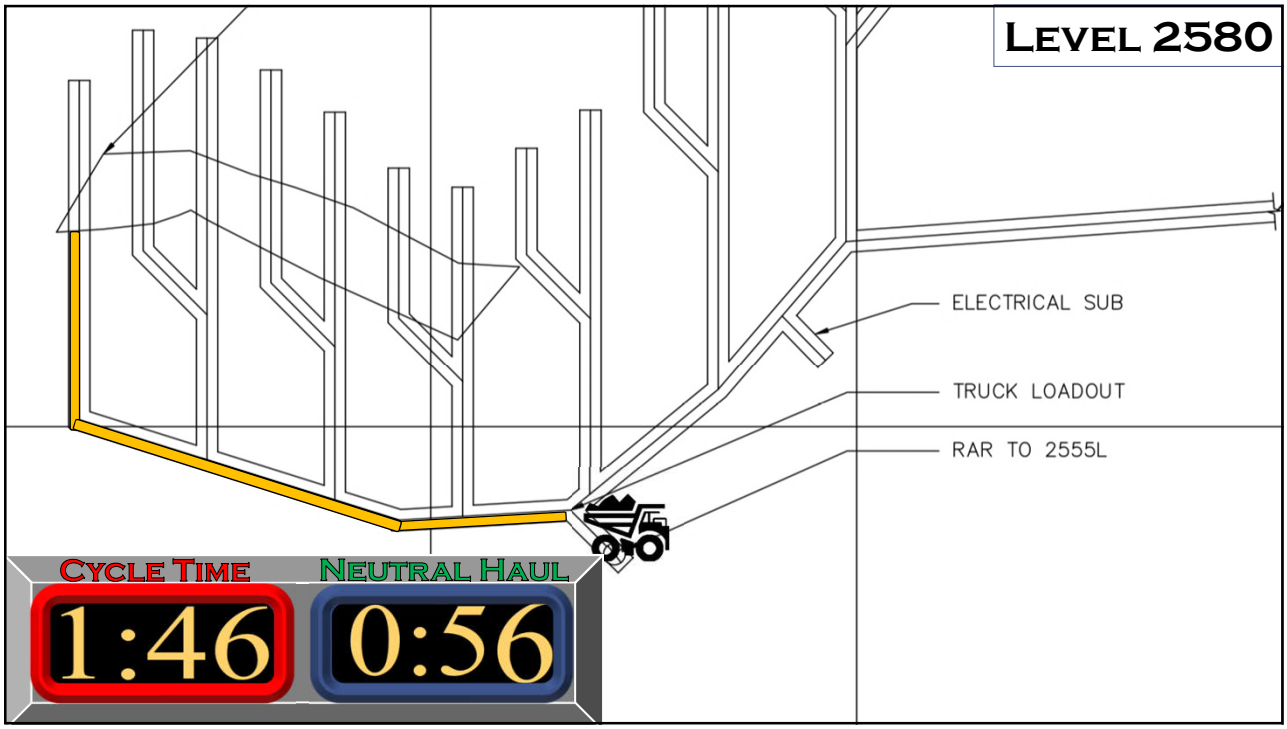

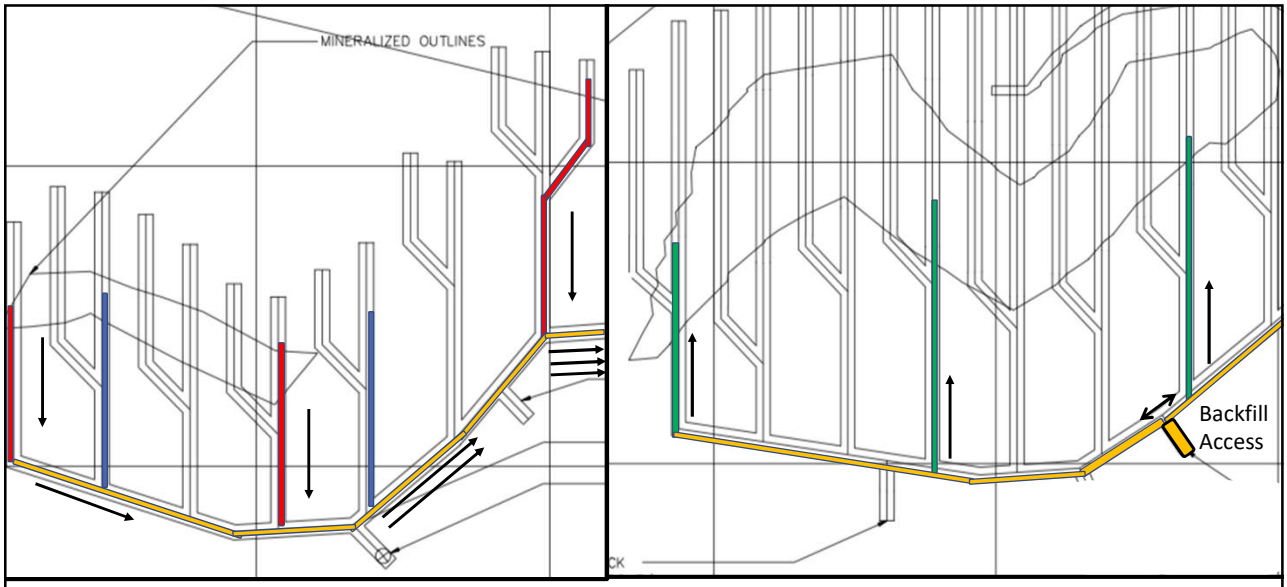

UNDERCUT [2580]

OVERCUT [2555]

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Major Design Considerations

Reduction of Diesel Reliance

- Expanding possible fleet options
- Four-fold reduction in machine idling / cycle

Employee Safety

- Safety mechanic in the case of whip back
- Minimal change in mine's operation
- Significant reduction in close quarters vehicle traffic

Zero Waste

- Belt is fully recyclable
- Composed of biodegradable rubber
- Opportunity for electrical system

Productivity Growth

- Productivity determined to be able to increase by 3x with possibility of compounding as stope lengths increase

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Summary

Utilizing Current Technology

This product integrates a current used process and by revamping it for underground extraction will lead to cost savings, higher production rates, and improved safety as the mining industry shifts away from diesel reliance.

Increased Production Summary

- Parked Time - Reduced by 79%
- Haulage Time on Primary Level - Reduced by 71%
- Daily Haulage Cycles - Increased by 384%
- Active Production 3840 t/Day
- Average Production 1536 t/Day → Approximately 5x increase

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Thank you
Questions?
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