

Figure 85: Landscape Character: Views 13, 14 and 15 (GYLA, 2020)



Figure 86: Landscape Character: View 16, 17 and 18 (GYLA, 2020)



View 19 looking east-north-east from Mahwelereng-B - 3,9 km away from centre of project site

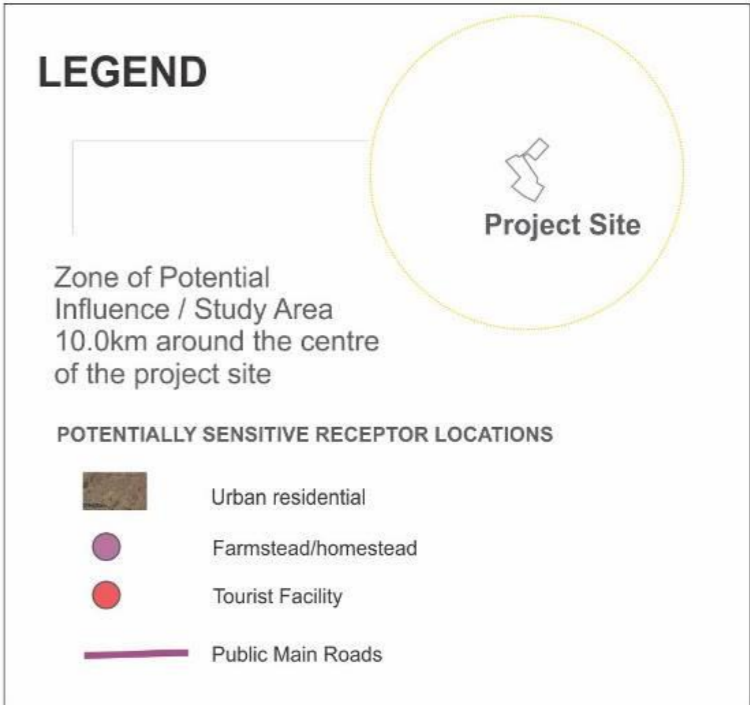
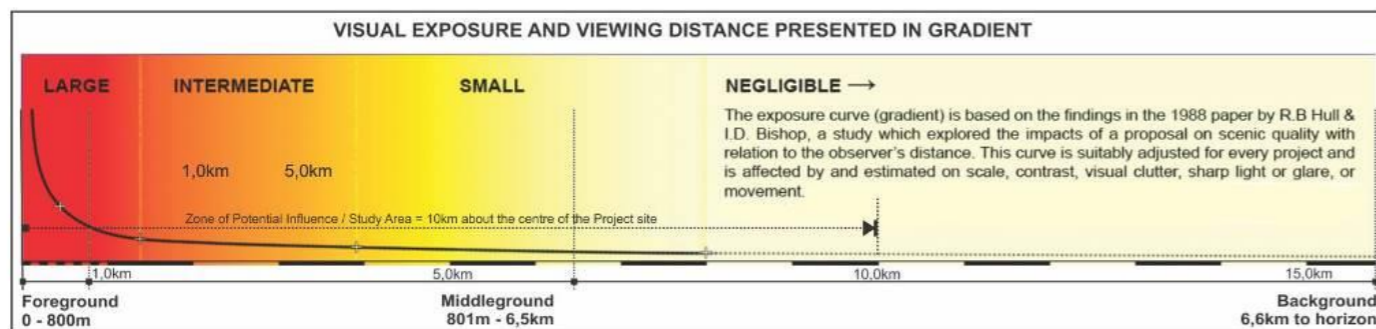
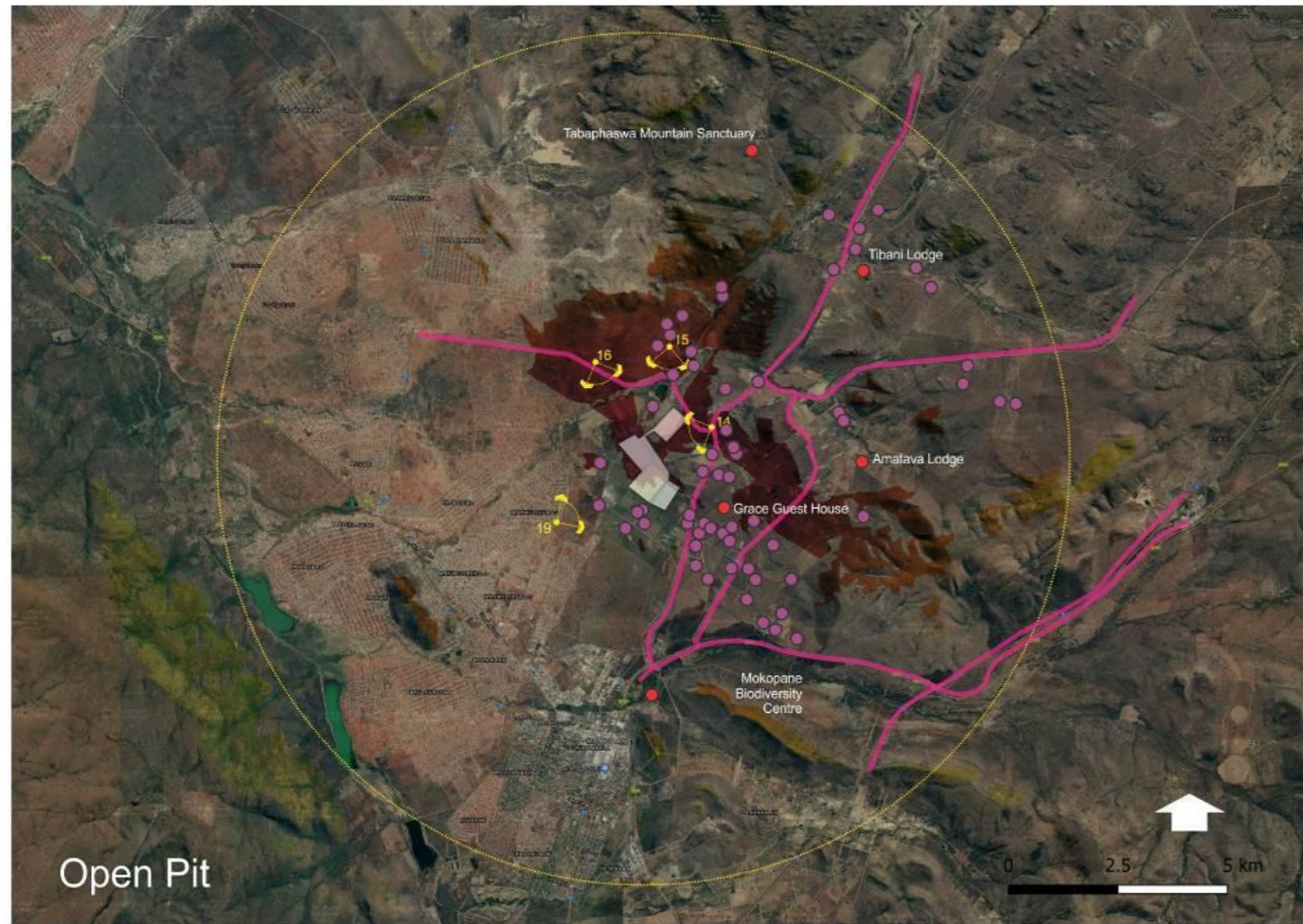


View 20 looking north-north-east from the Percy Fyfe road - 4,4 away to centre of site



View 21 looking east from the Percy Fyfe road - 3,2 km away to centre of project site

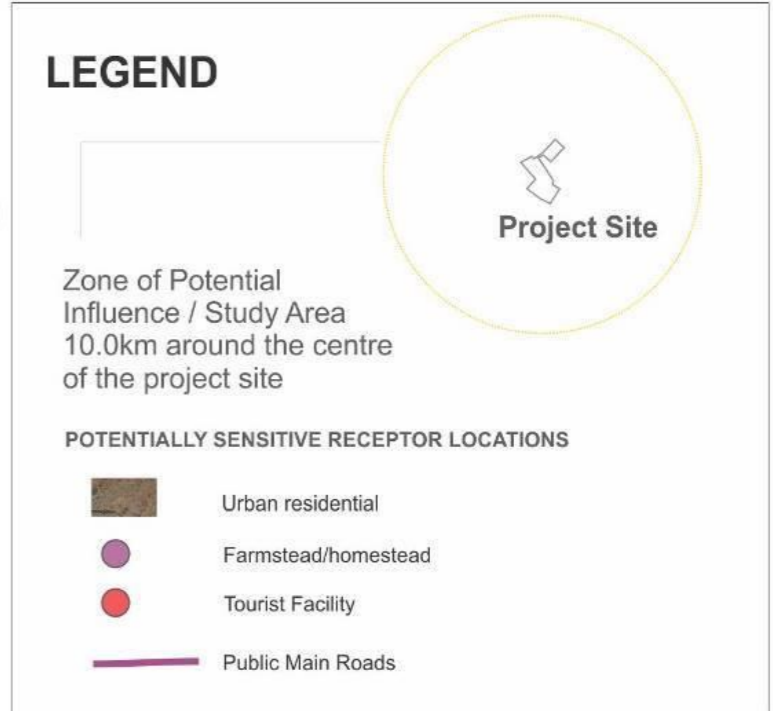
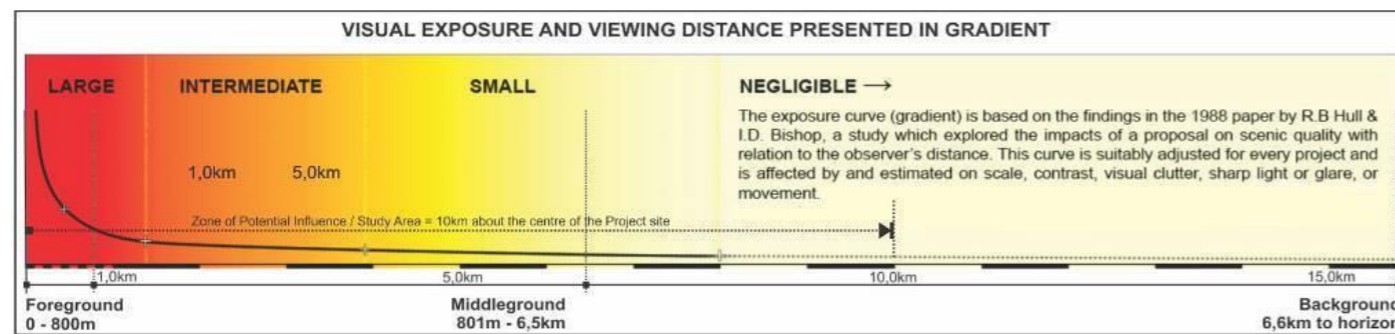
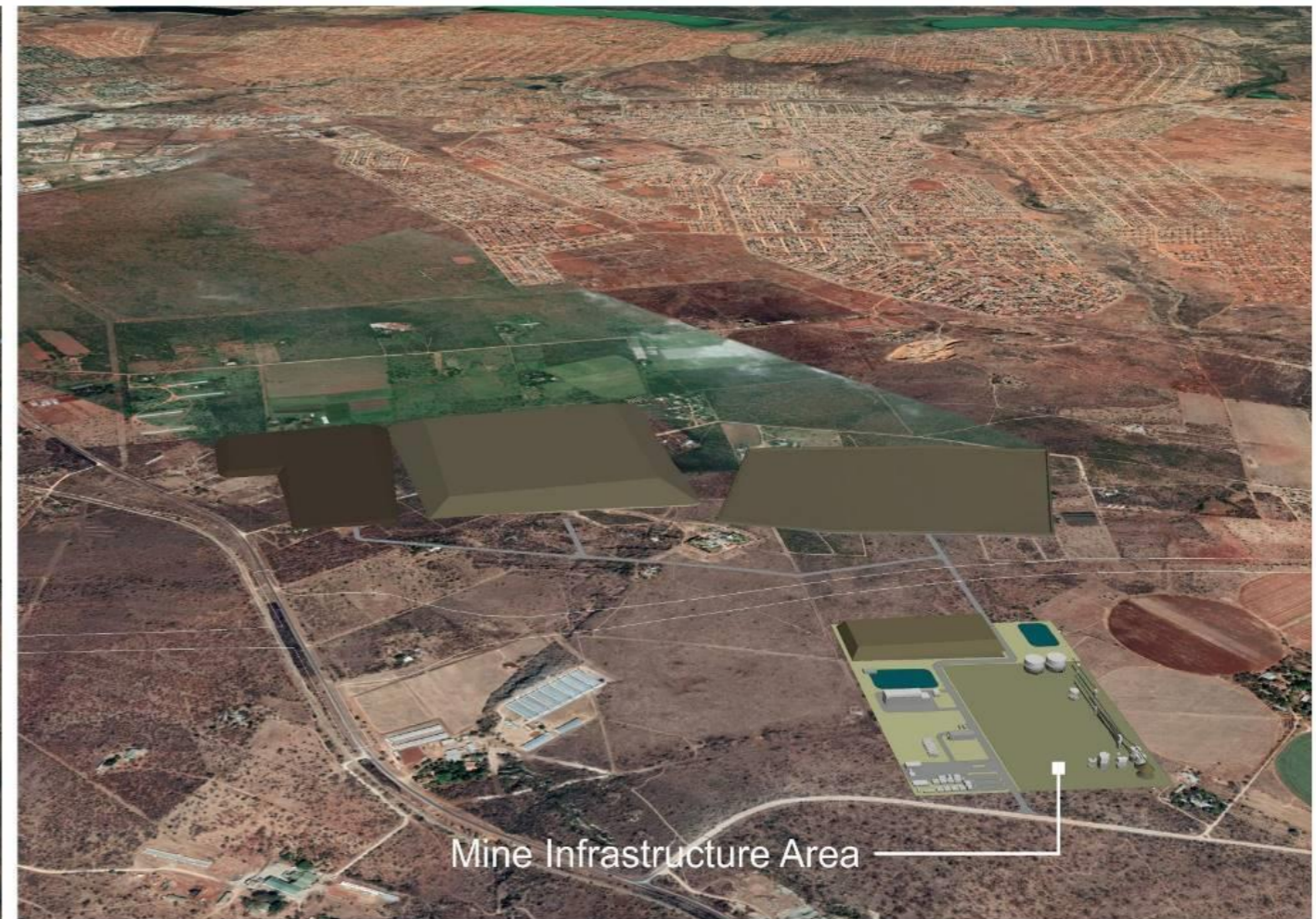
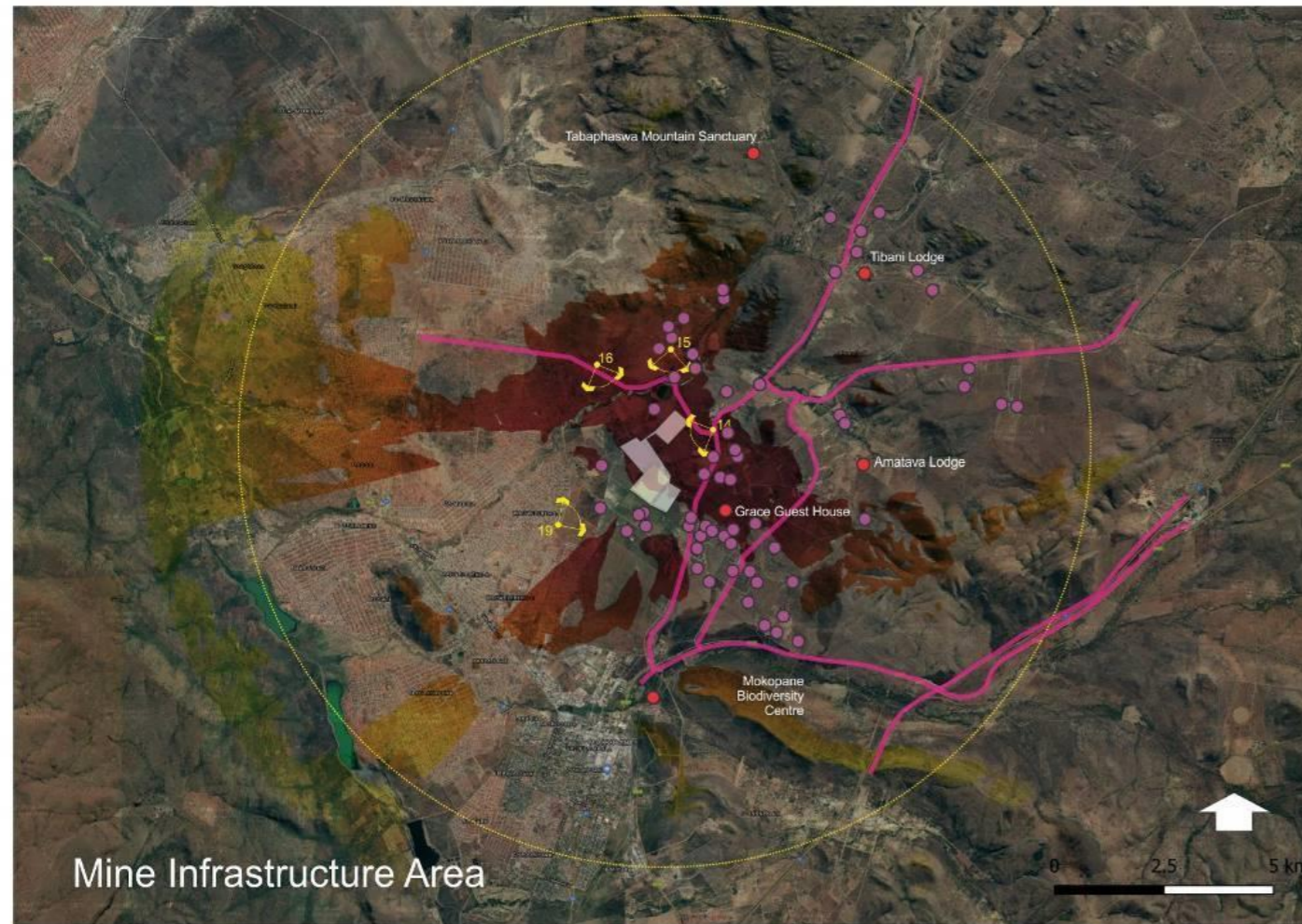
Figure 87: Landscape Character: Views 19, 20 and 21 (GYLA, 2020)



Note:
 The accuracy of the viewshed analysis depends on the quality of the input digital surface model (DSM). Readily available digital contours for the area are limited to 20m contours. We have interpolated these down to 1m intervals to get better accuracy. However, these types of viewshed investigations (using readily available GIS software and terrain contours only) are limited in their accuracy due to their inability to incorporate vegetation information. On-site observations indicated that most views from within the study area would actually be blocked to the mine. And that no unobstructed views would be available, even within the middle to foreground of views.

The viewshed analyses have therefore been included only as a comparative analysis between the 'approved' layout and the proposed 'amended' layout, which is the focus of this VIA.

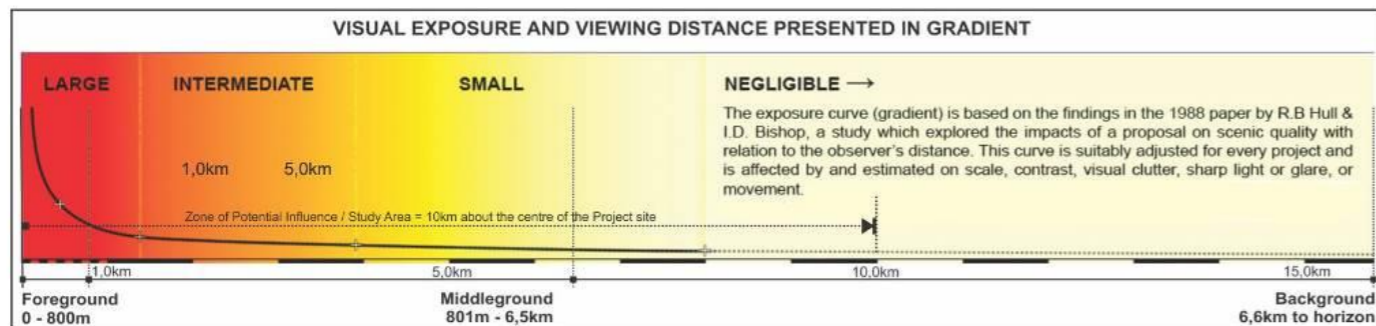
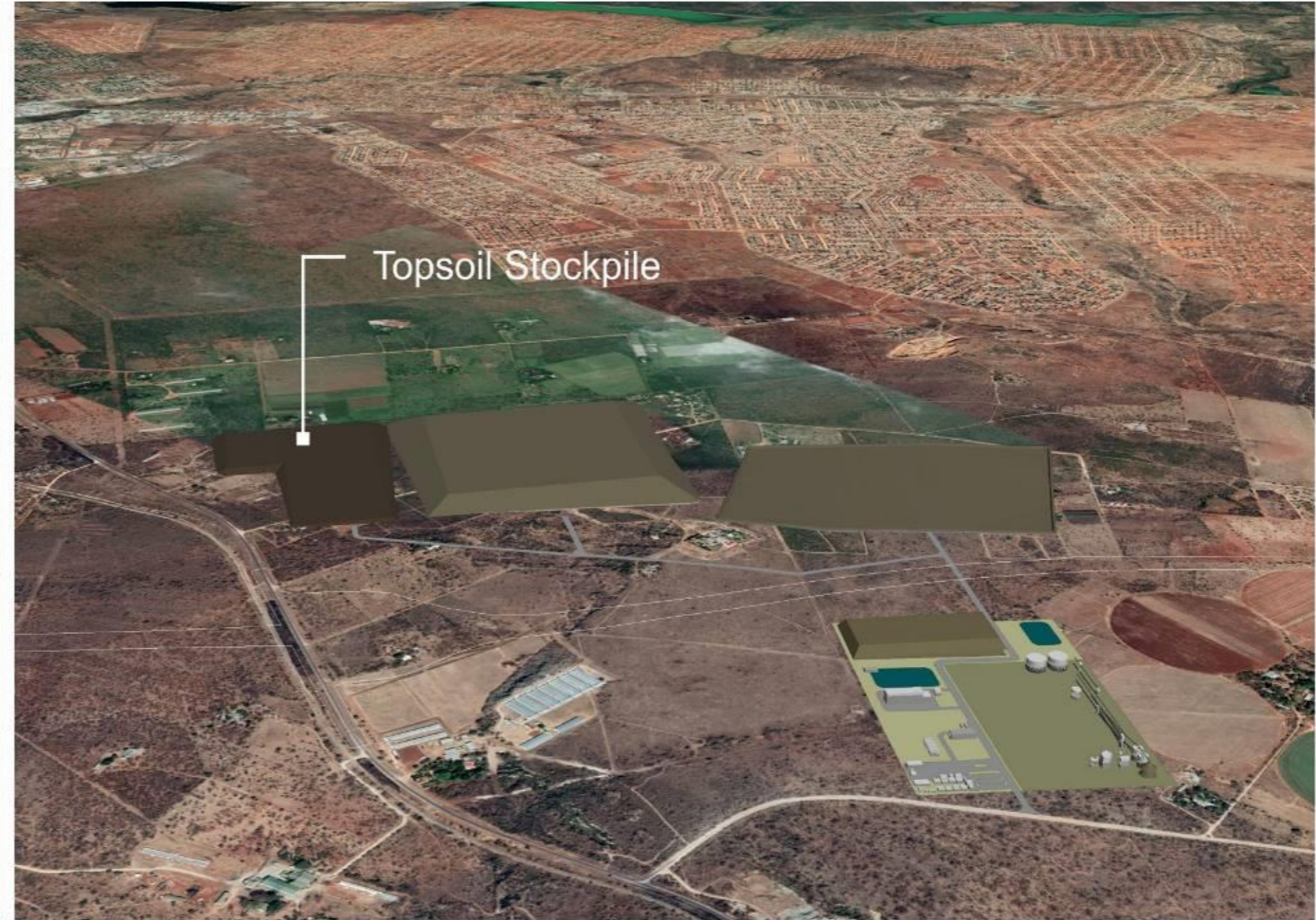
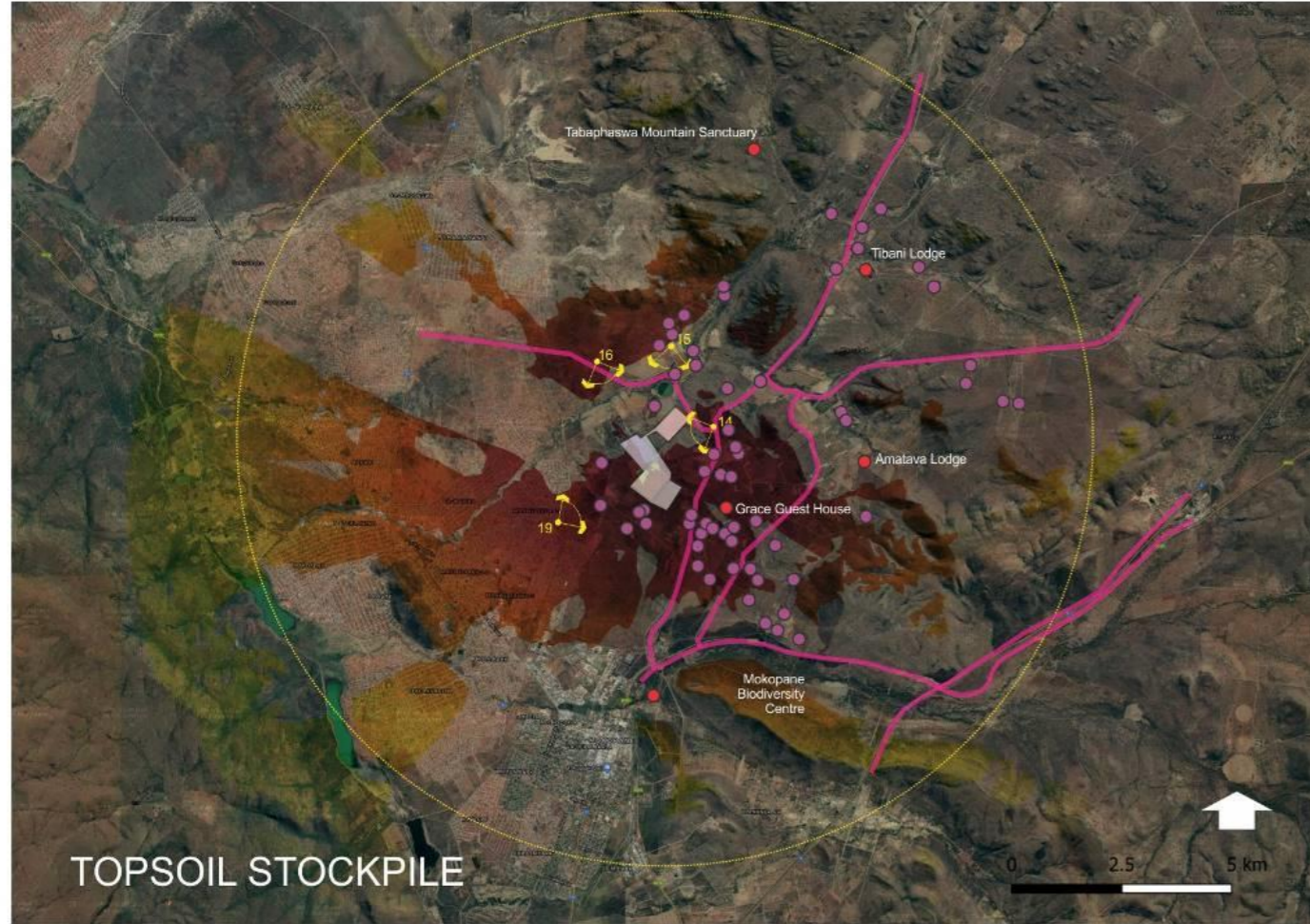
Figure 88: Viewshed Analyses – Open Pit (GYLA, 2020)



Note:
The accuracy of the viewshed analysis depends on the quality of the input digital surface model (DSM). Readily available digital contours for the area are limited to 20m contours. We have interpolated these down to 1m intervals to get better accuracy. However, these types of viewshed investigations (using readily available GIS software and terrain contours only) are limited in their accuracy due to their inability to incorporate vegetation information. On-site observations indicated that most views from within the study area would actually be blocked to the mine. And that no unobstructed views would be available, even within the middle to foreground of views.

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Figure 89: Viewshed Analyses – Mine Infrastructure Area (GYLA, 2020)



LEGEND

Zone of Potential Influence / Study Area 10.0km around the centre of the project site

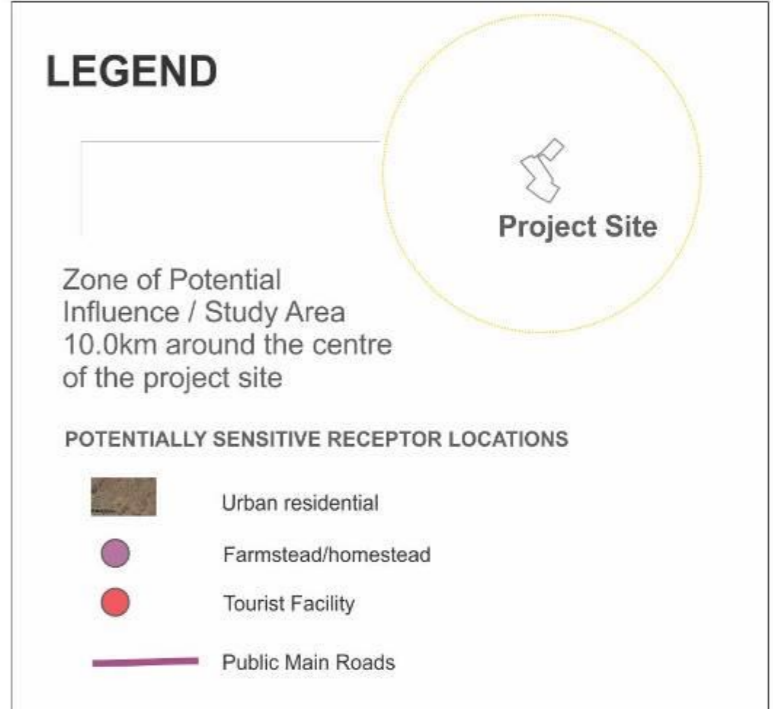
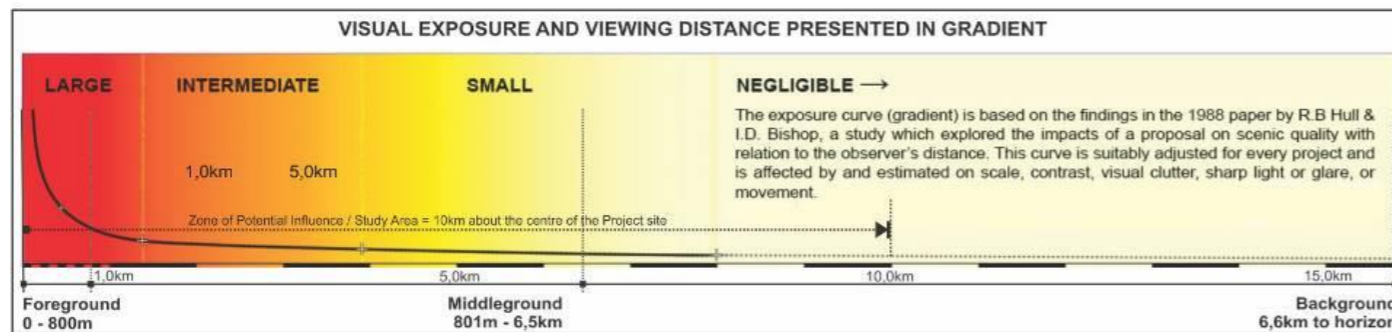
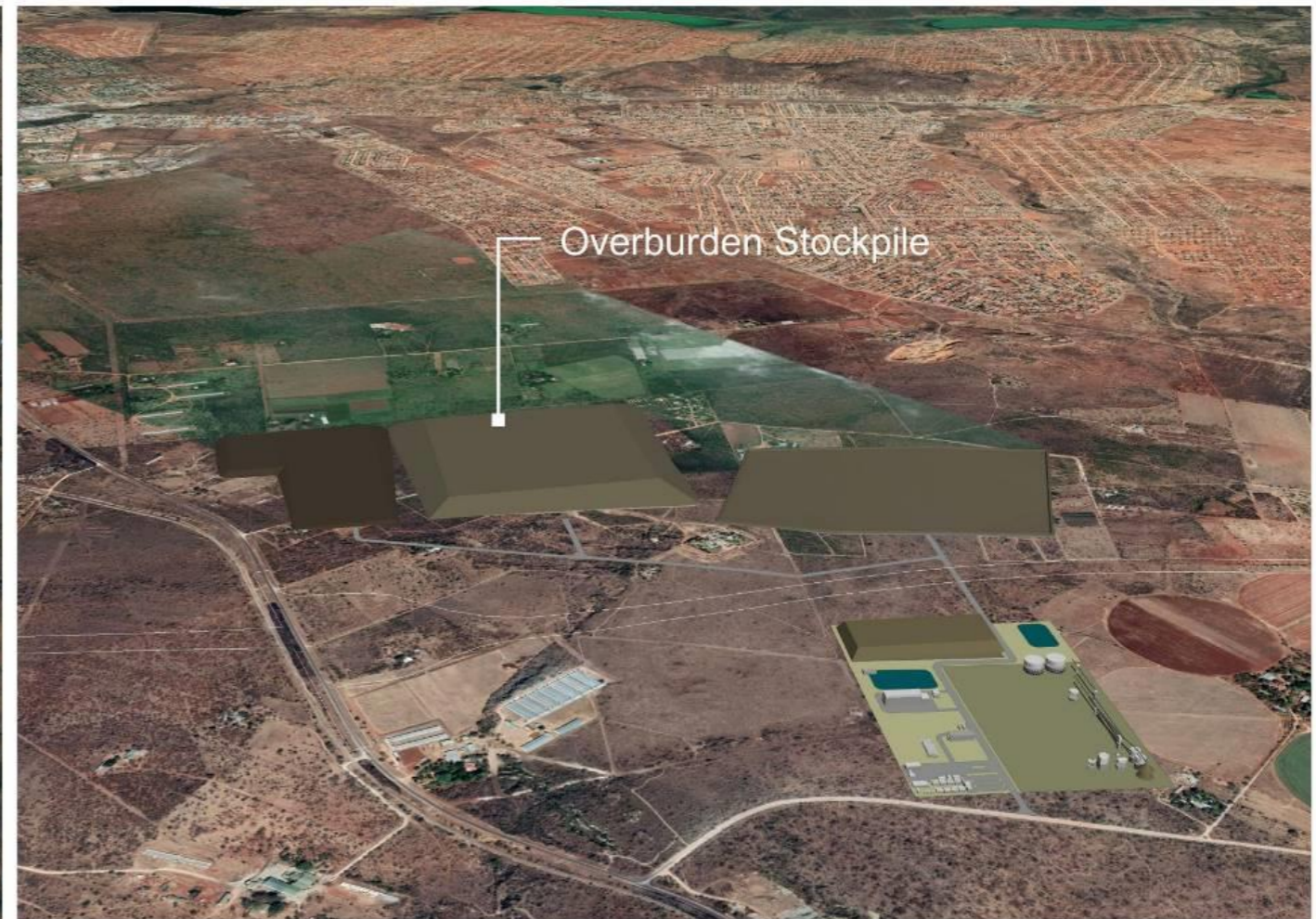
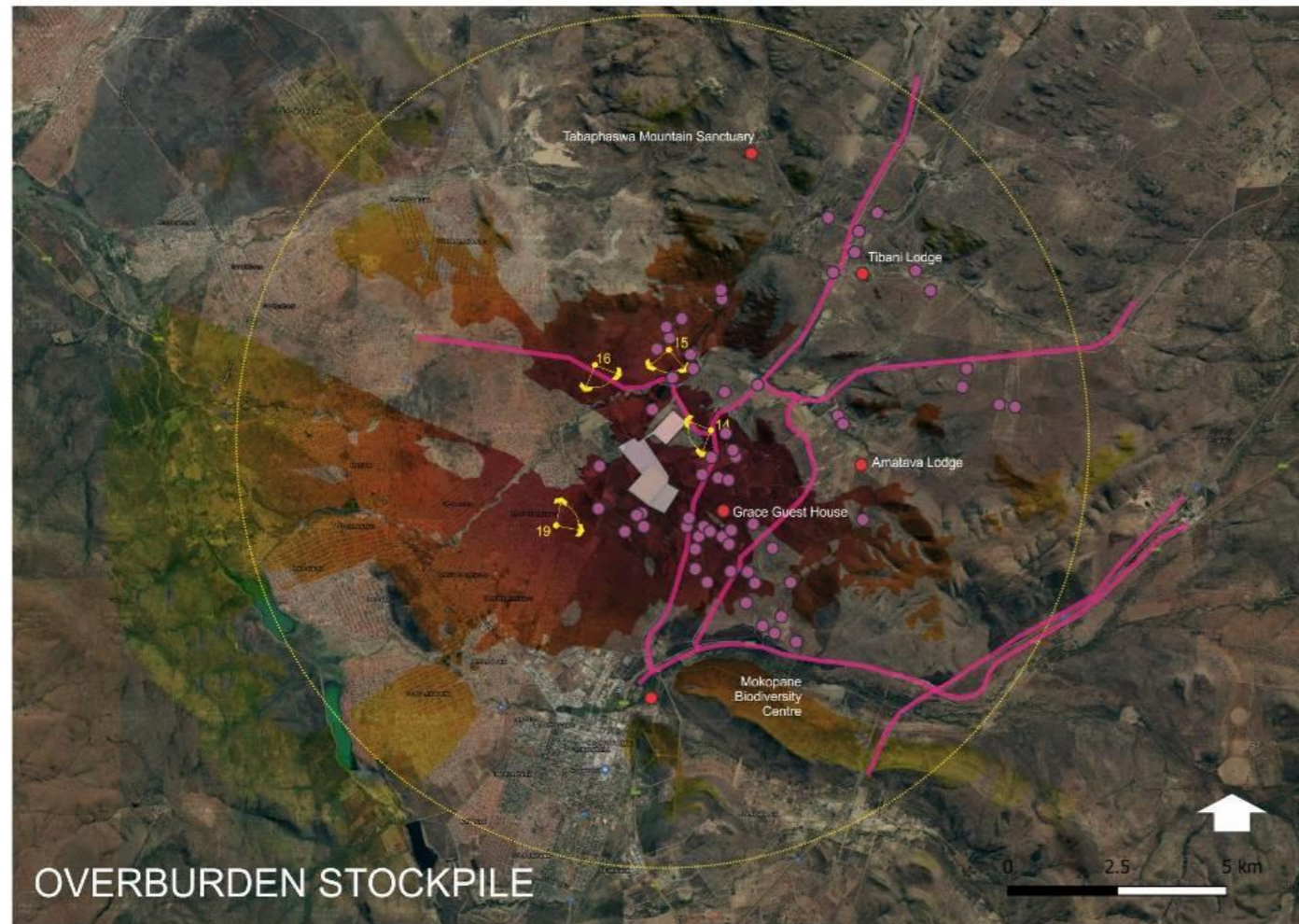
POTENTIALLY SENSITIVE RECEPTOR LOCATIONS

- Urban residential
- Farmstead/homestead
- Tourist Facility
- Public Main Roads

Note:
 The accuracy of the viewshed analysis depends on the quality of the input digital surface model (DSM). Readily available digital contours for the area are limited to 20m contours. We have interpolated these down to 1m intervals to get better accuracy. However, these types of viewshed investigations (using readily available GIS software and terrain contours only) are limited in their accuracy due to their inability to incorporate vegetation information. On-site observations indicated that most views from within the study area would actually be blocked to the mine. And that no unobstructed views would be available, even within the middle to foreground of views.

The viewshed analyses have therefore been included only as a comparative analysis between the 'approved' layout and the proposed 'amended' layout, which is the focus of this VIA.

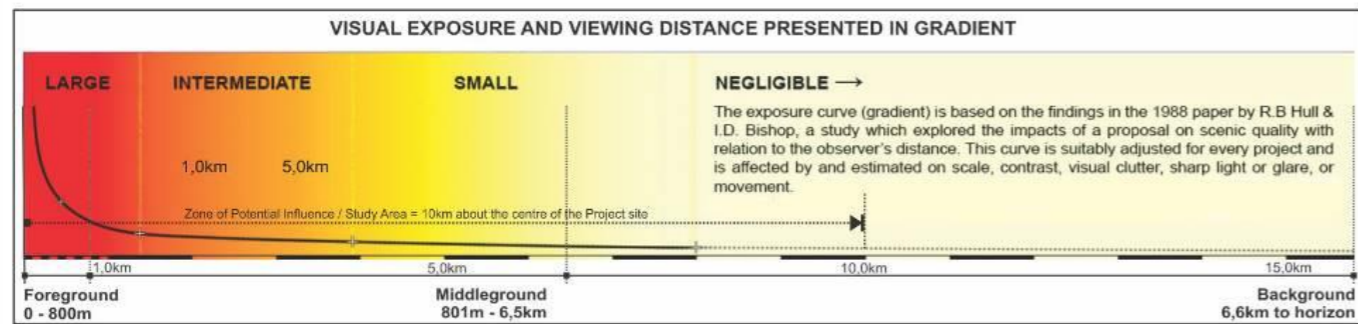
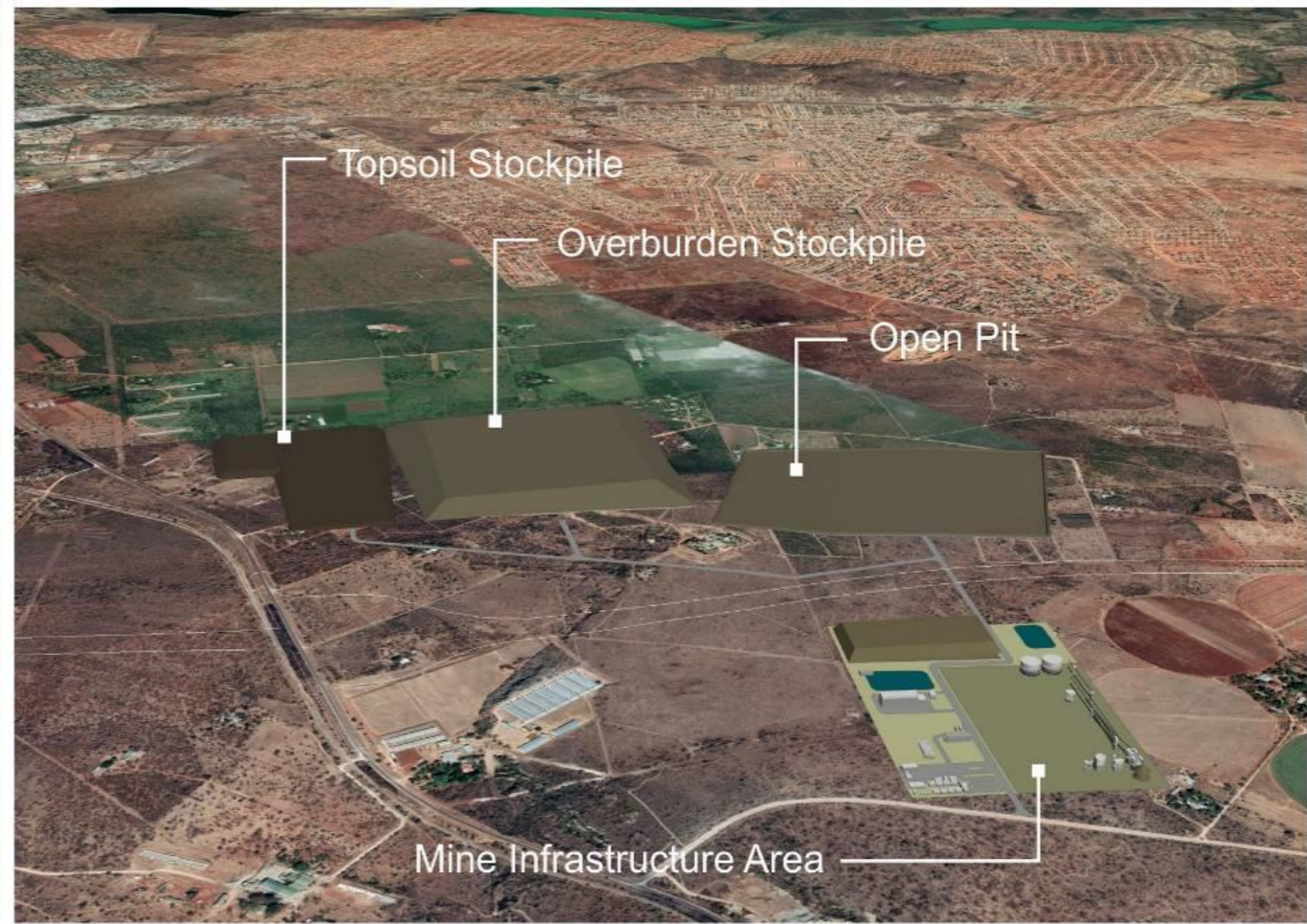
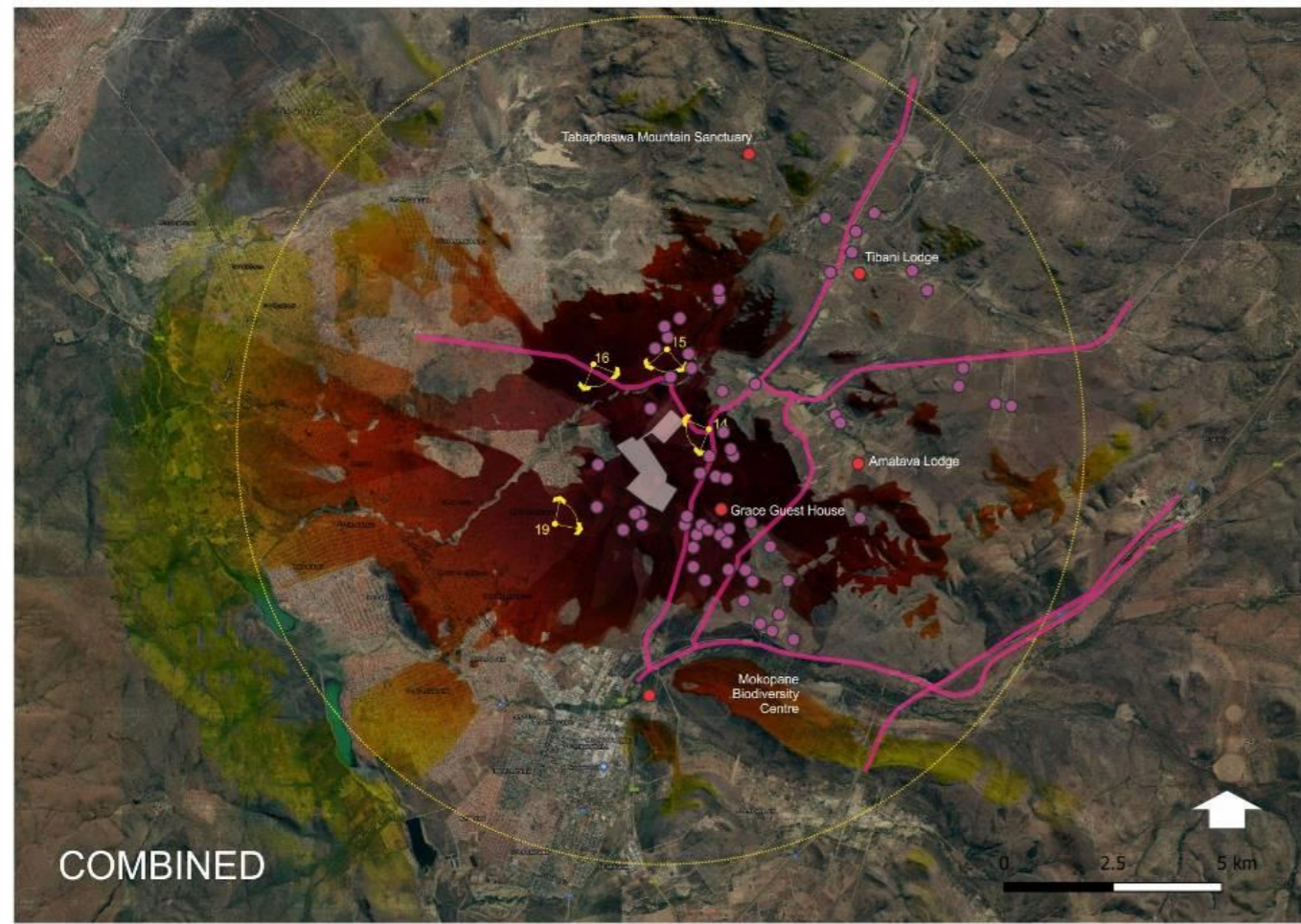
Figure 90: Viewshed Analyses – Topsoil Stockpile (GYLA, 2020)



Note:
The accuracy of the viewshed analysis depends on the quality of the input digital surface model (DSM). Readily available digital contours for the area are limited to 20m contours. We have interpolated these down to 1m intervals to get better accuracy. However, these types of viewshed investigations (using readily available GIS software and terrain contours only) are limited in their accuracy due to their inability to incorporate vegetation information. On-site observations indicated that most views from within the study area would actually be blocked to the mine. And that no unobstructed views would be available, even within the middle to foreground of views.

The viewshed analyses have therefore been included only as a comparative analysis between the 'approved' layout and the proposed 'amended' layout, which is the focus of this VIA.

Figure 91: Viewshed Analyses – Overburden Facility (GYLA, 2020)



Note:

The accuracy of the viewshed analysis depends on the quality of the input digital surface model (DSM). Readily available digital contours for the area are limited to 20m contours. We have interpolated these down to 1m intervals to get better accuracy. However, these types of viewshed investigations (using readily available GIS software and terrain contours only) are limited in their accuracy due to their inability to incorporate vegetation information. On-site observations indicated that most views from within the study area would actually be blocked to the mine. And that no unobstructed views would be available, even within the middle to foreground of views.

The viewshed analyses have therefore been included only as a comparative analysis between the 'approved' layout and the proposed 'amended' layout, which is the focus of this VIA.



Figure 92: Viewshed Analyses – All mining activities (GYLA, 2020)



Figure 93: Landscape Character: Simulation View 14 (GYLA, 2020)



Figure 94: Landscape Character: Simulation View 15 (GYLA, 2020)

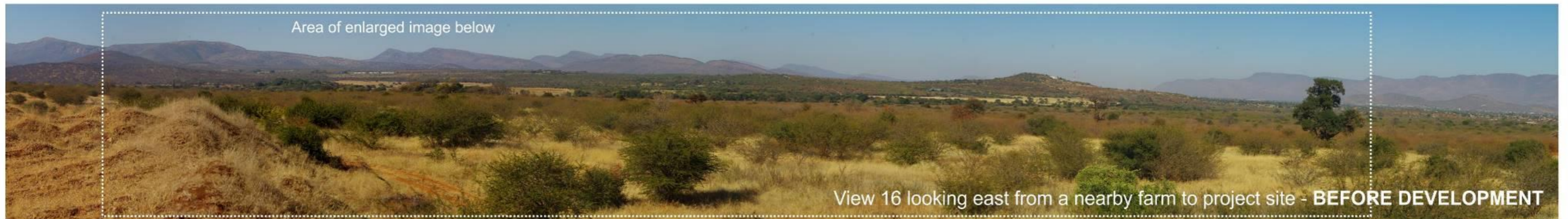


Figure 95: Landscape Character: Simulation View 16 (GYLA, 2020)

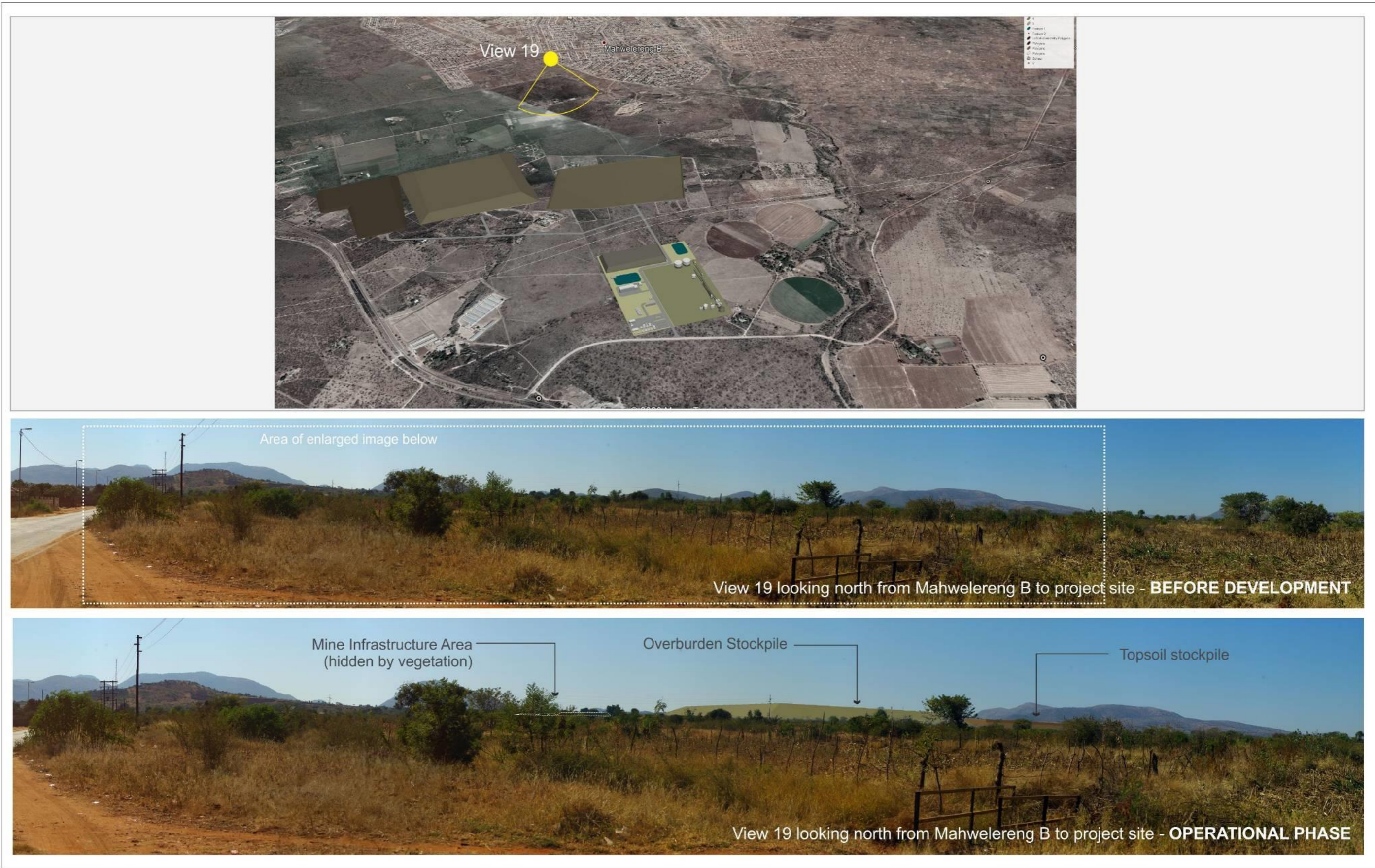


Figure 96: Landscape Character: Simulation View 19 (GYLA, 2020)

76. APPENDIX 10: PROJECTED NOISE RATING LEVELS

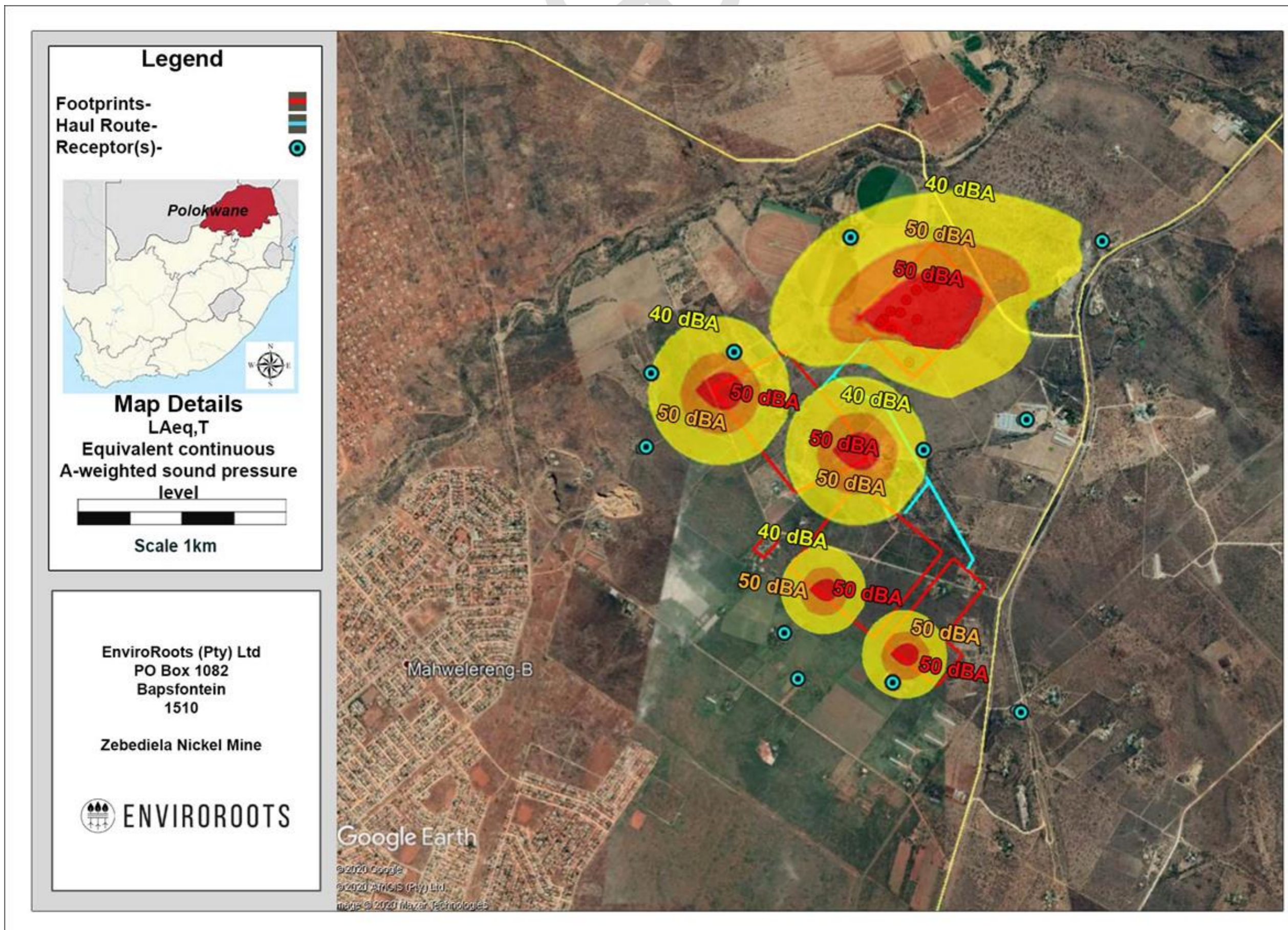


Figure 97: Equivalent Continuous Rating Level - noise contours LReq,T – Operational Phase

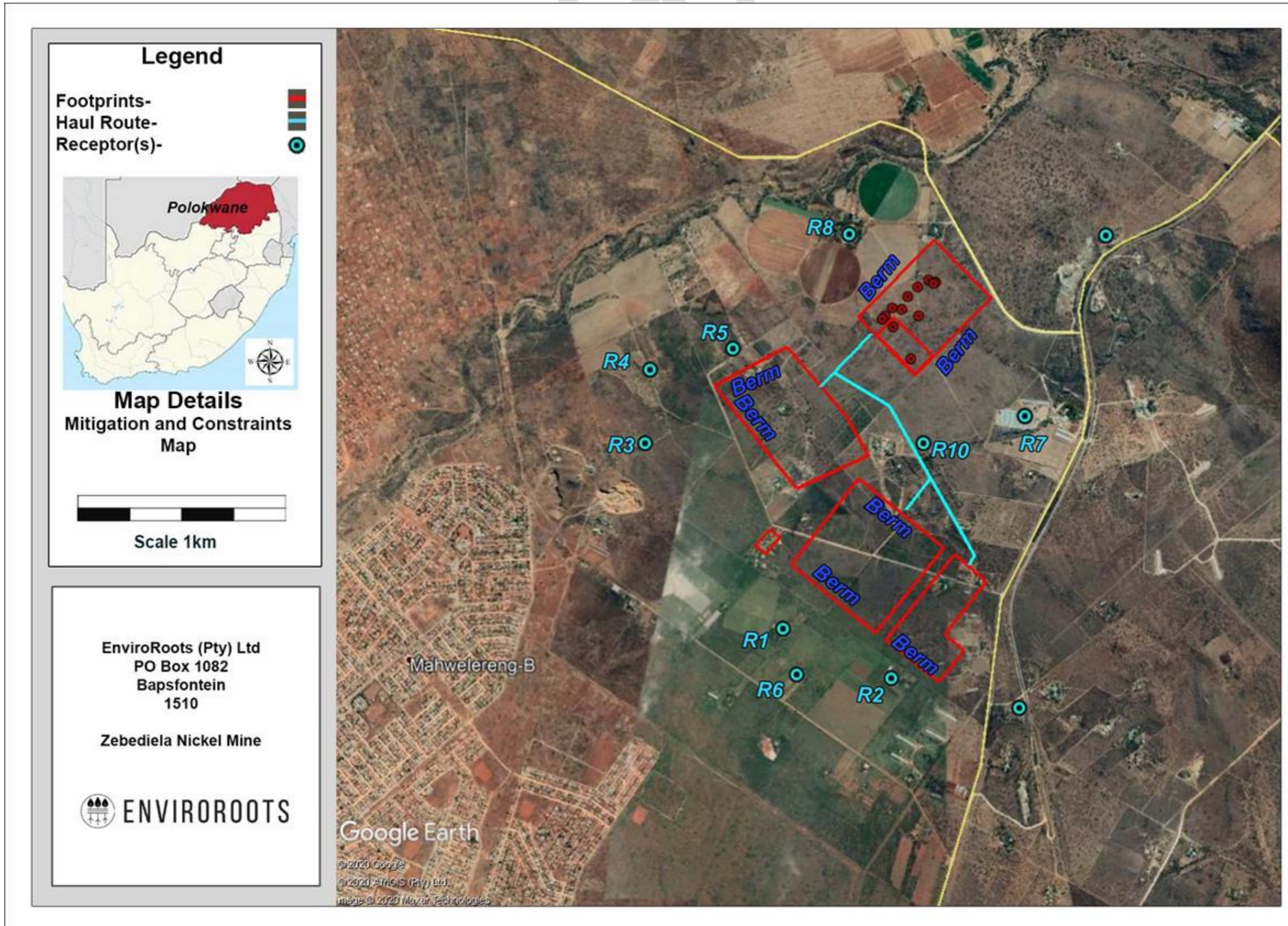


Figure 98: Mitigation and constraints maps

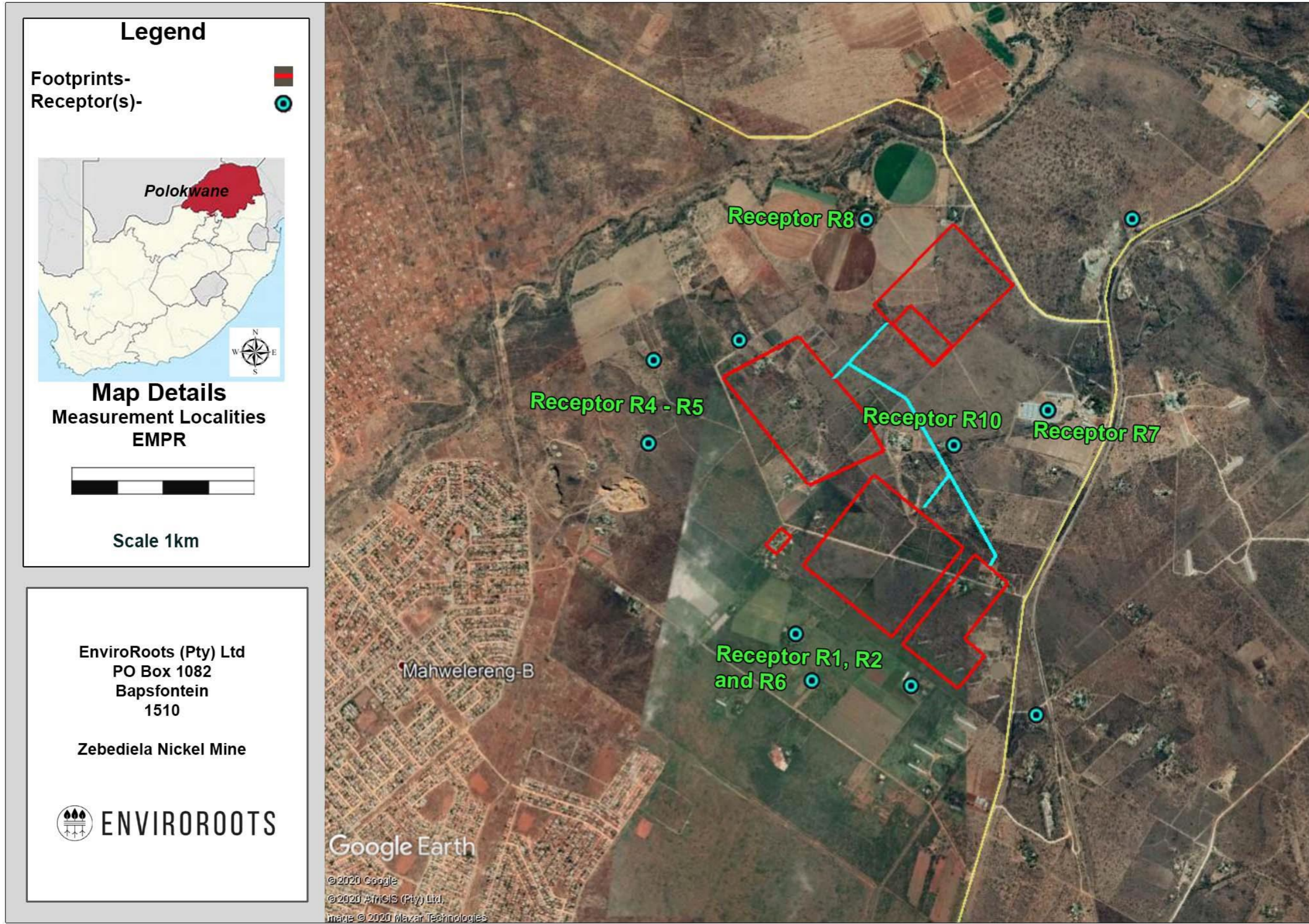


Figure 99: Monitoring Localities and frequencies

77. APPENDIX 11: ATMOSPHERIC DISPERSION MODELLING

Transporting the Run of Mine (ROM) from the pit to the crusher plant by means of haul trucks (scenario 1) and by means of conveyor (scenario 2) was assessed. The figures below however only reflect scenario 1 as this was the worst-case scenario with the larger impact. It should be noted that the modelled area of exceedance with regards to PM2.5 and PM10 is identical for both scenarios; however a reduction of the area of exceedance for total particulate deposition (dustfall) will be applicable with the use of conveyors (scenario 2).

Figure 106 and Figure 107 indicated the unmitigated and mitigated impact on poultry broilers in the project area due to the proposed project operations.

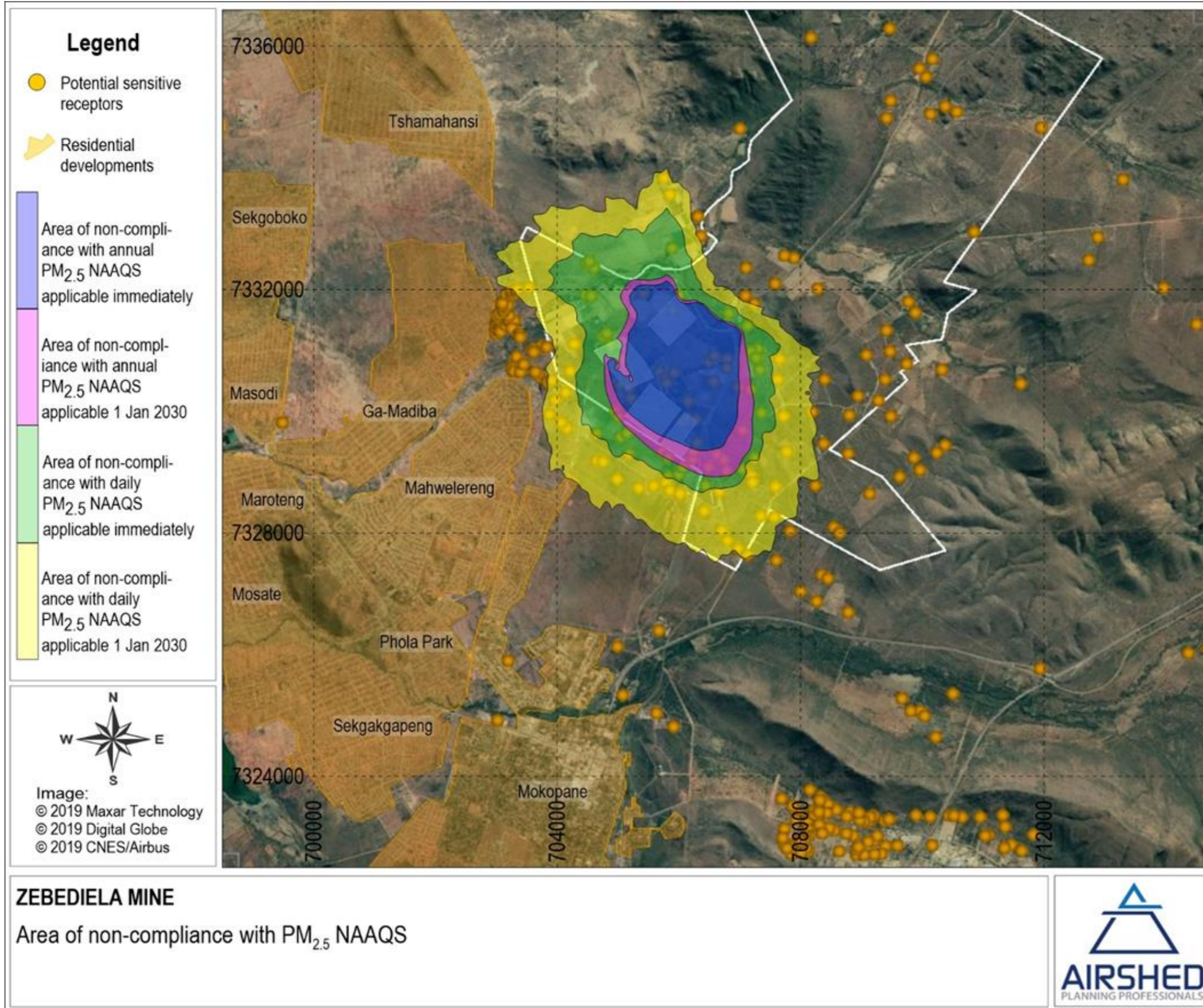


Figure 100: Area of non-compliance of PM_{2.5} NAAQS due to routine unmitigated project operations (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

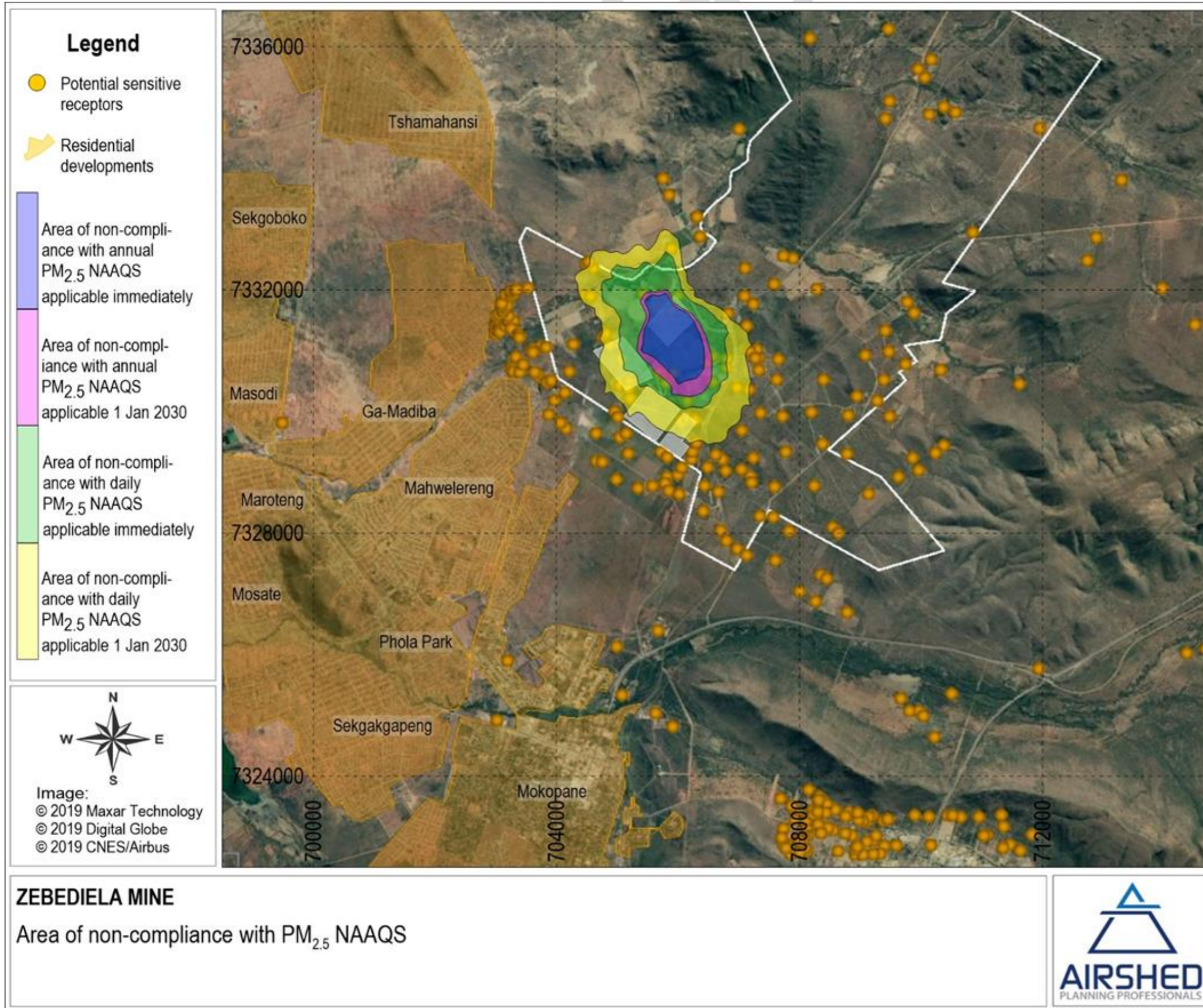


Figure 101: Area of non-compliance of PM_{2.5} NAAQS due to routine mitigated project operations, assuming 90% control efficiency on unpaved haul and access road and 50% control efficiency on crushing activities (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

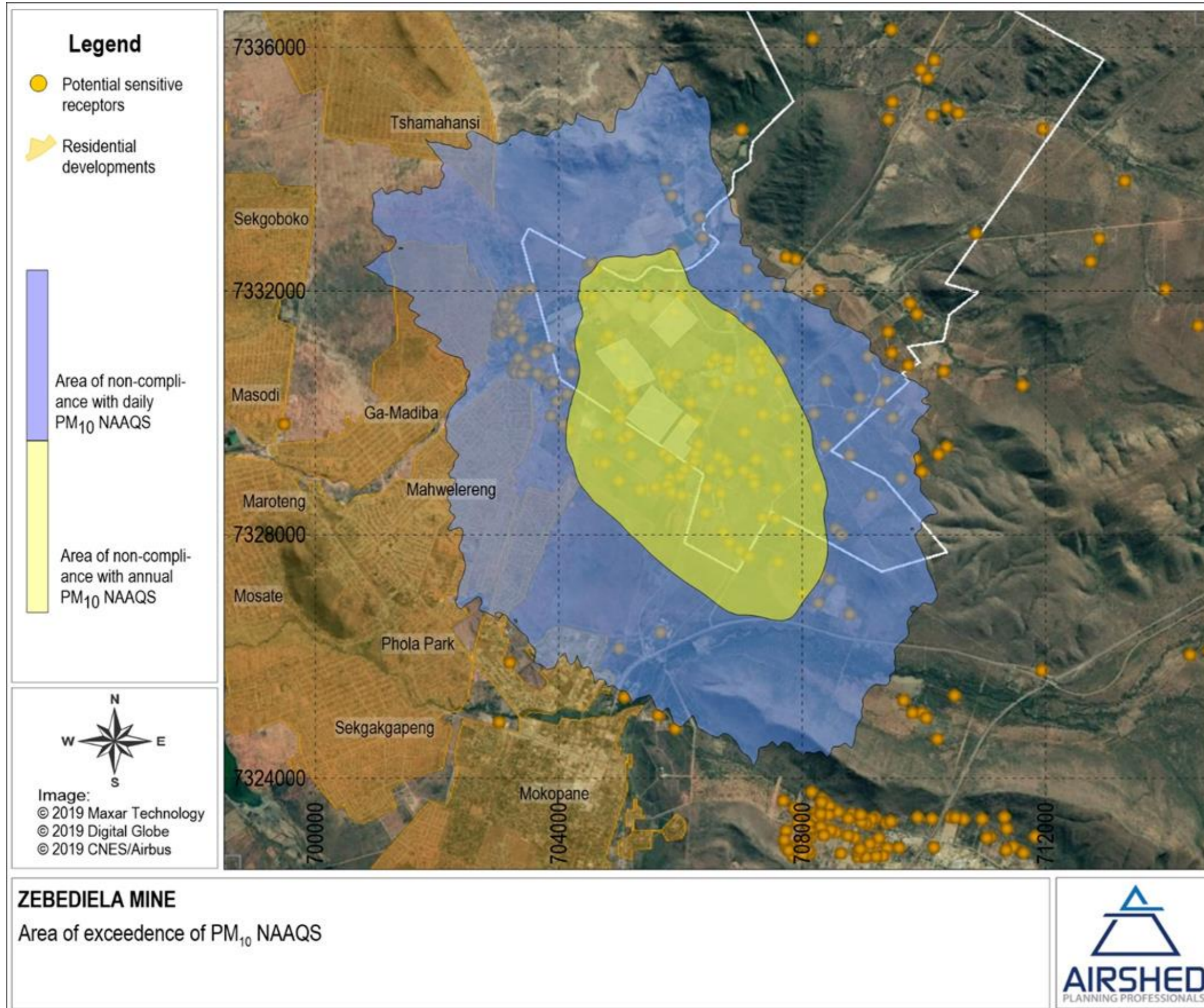


Figure 102: Area of non-compliance of PM10 NAAQS due to routine unmitigated project operations (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

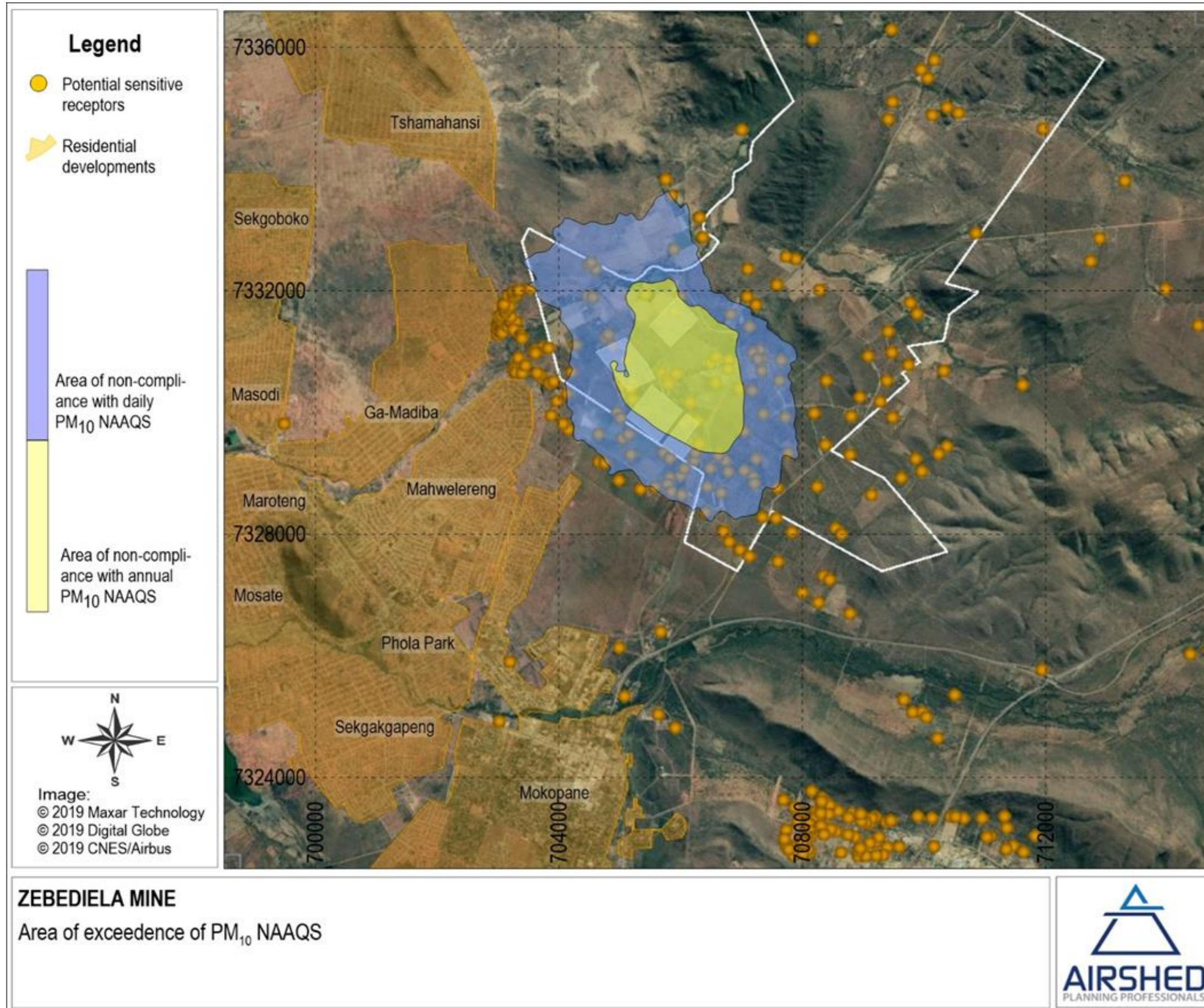


Figure 103: Area of non-compliance of PM₁₀ NAAQS due to routine mitigated project operations, assuming 90% control efficiency on unpaved haul and access road and 50% control efficiency on crushing activities (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

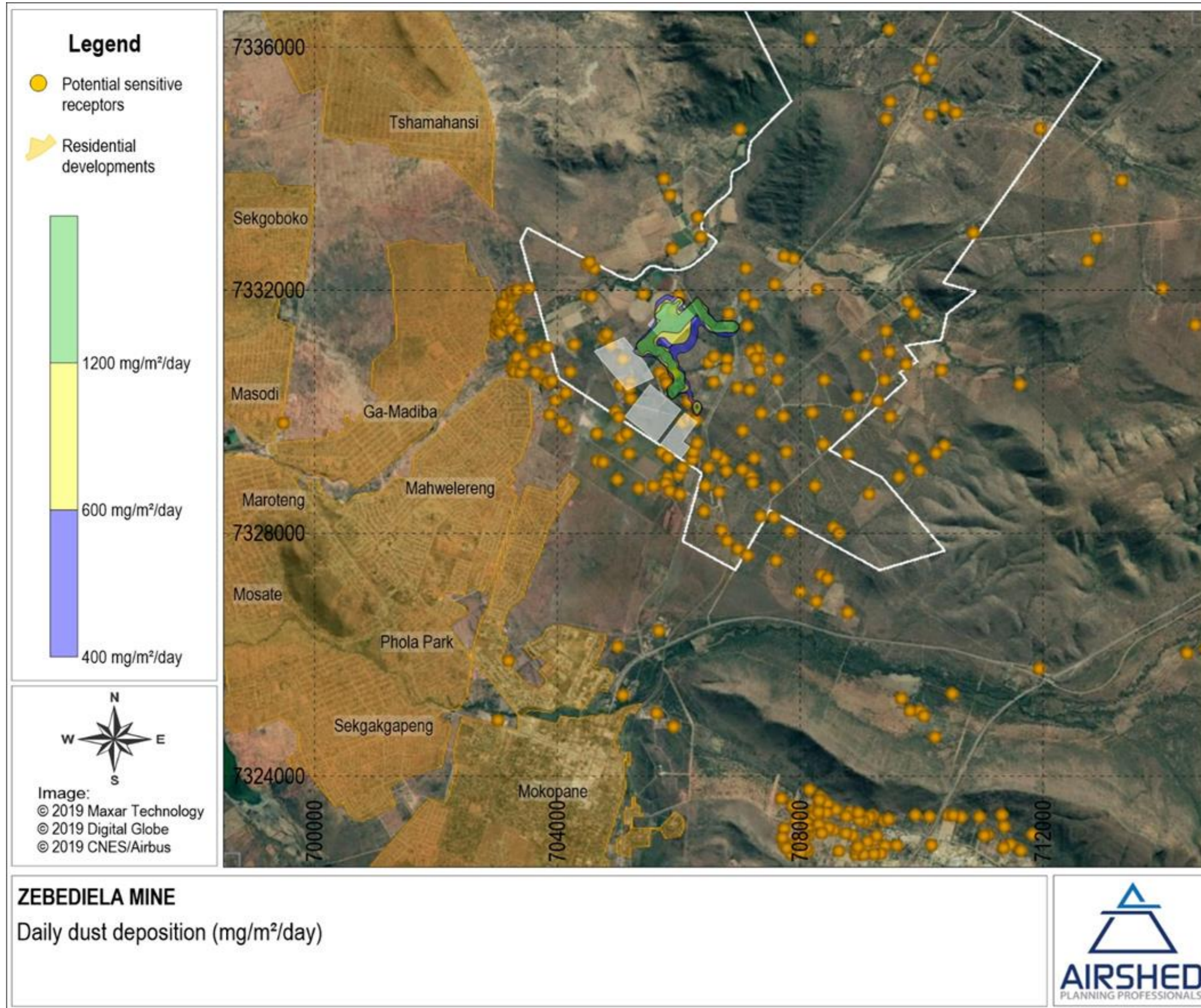


Figure 104: Total particulate deposition due to routine unmitigated project operations (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

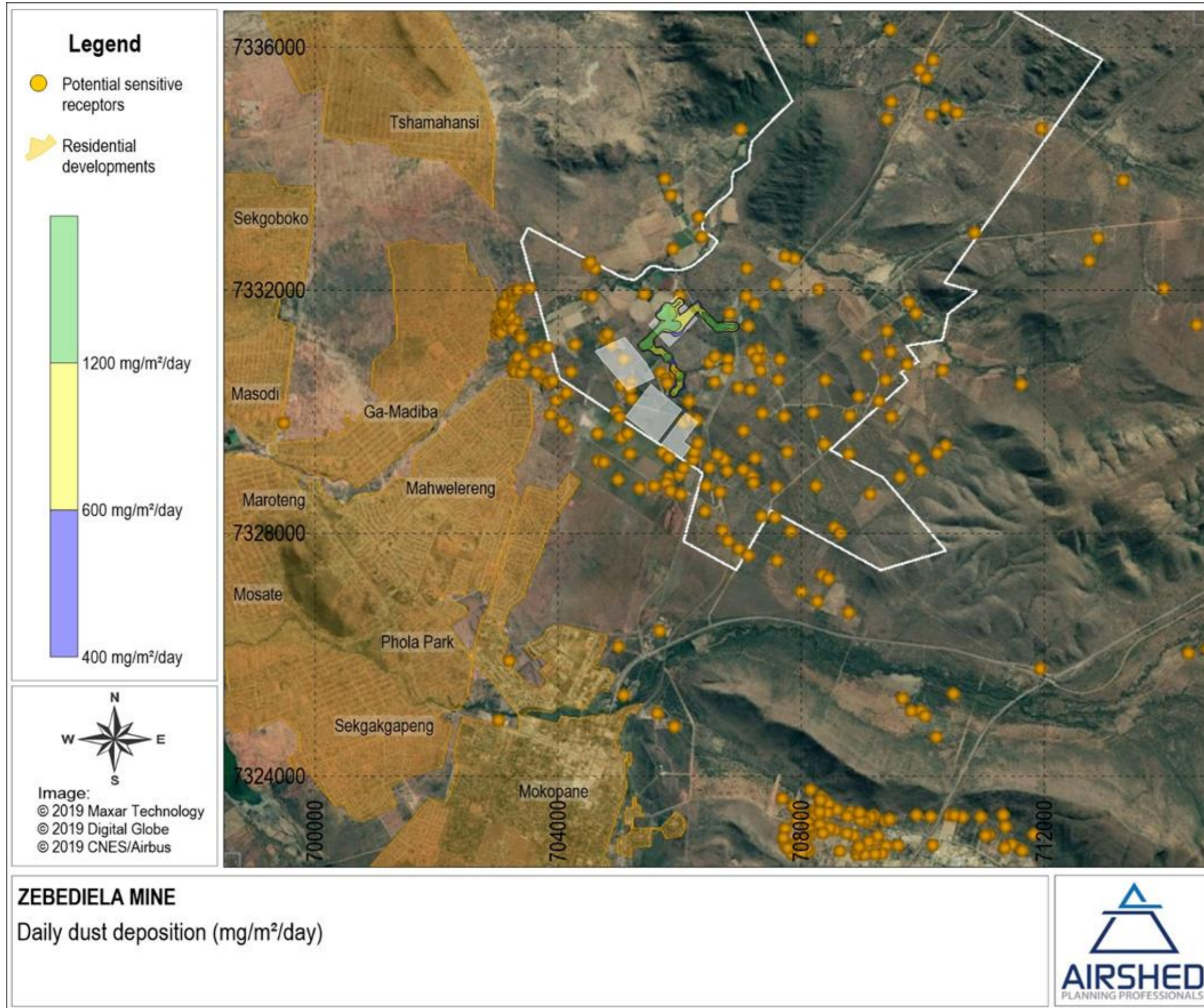


Figure 105: Total particulate deposition due to routine mitigated project operations, assuming 90% control efficiency on unpaved haul and access road and 50% control efficiency on crushing activities (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

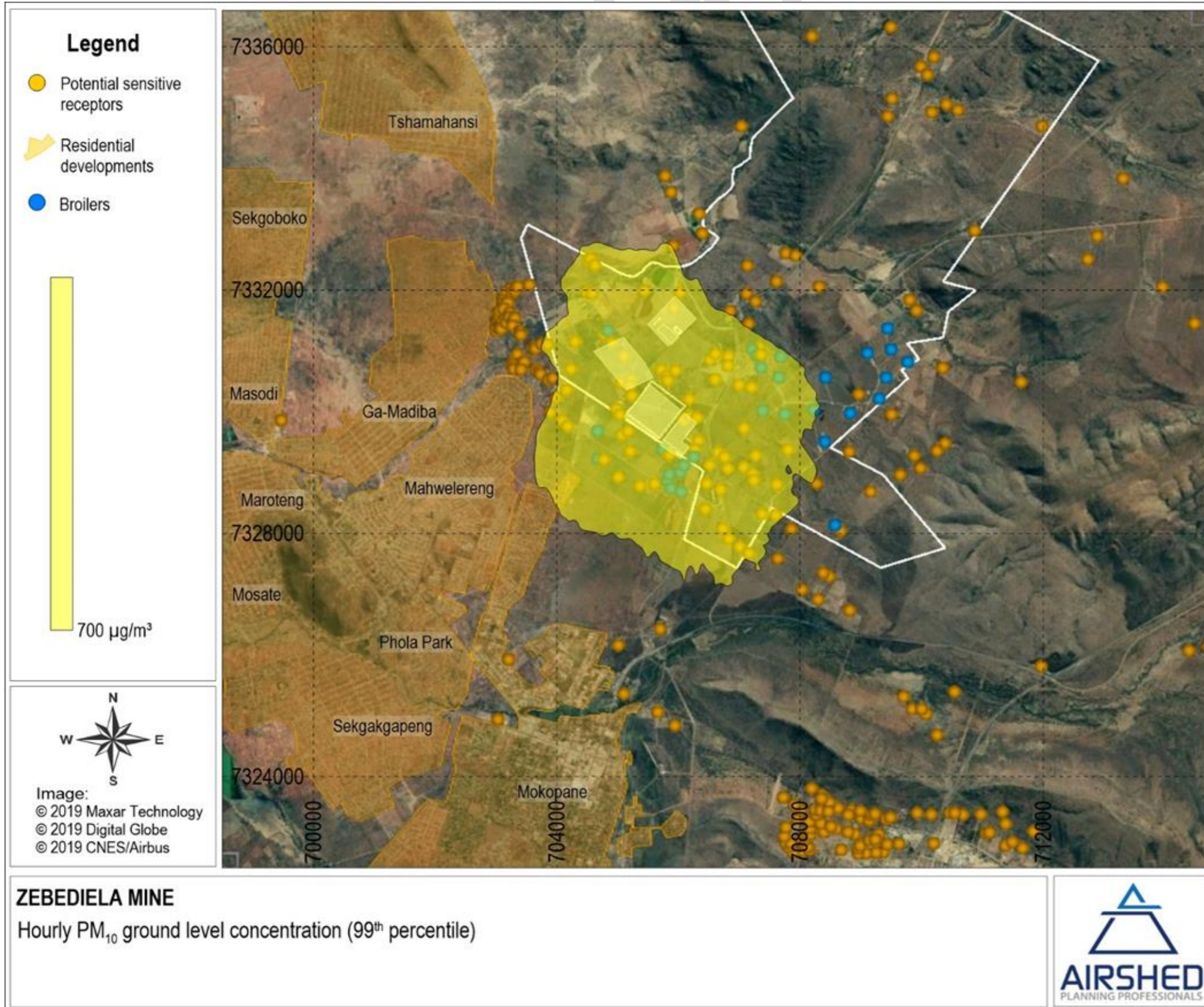


Figure 106: Hourly PM10 ground level concentrations due to routine unmitigated project operations (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

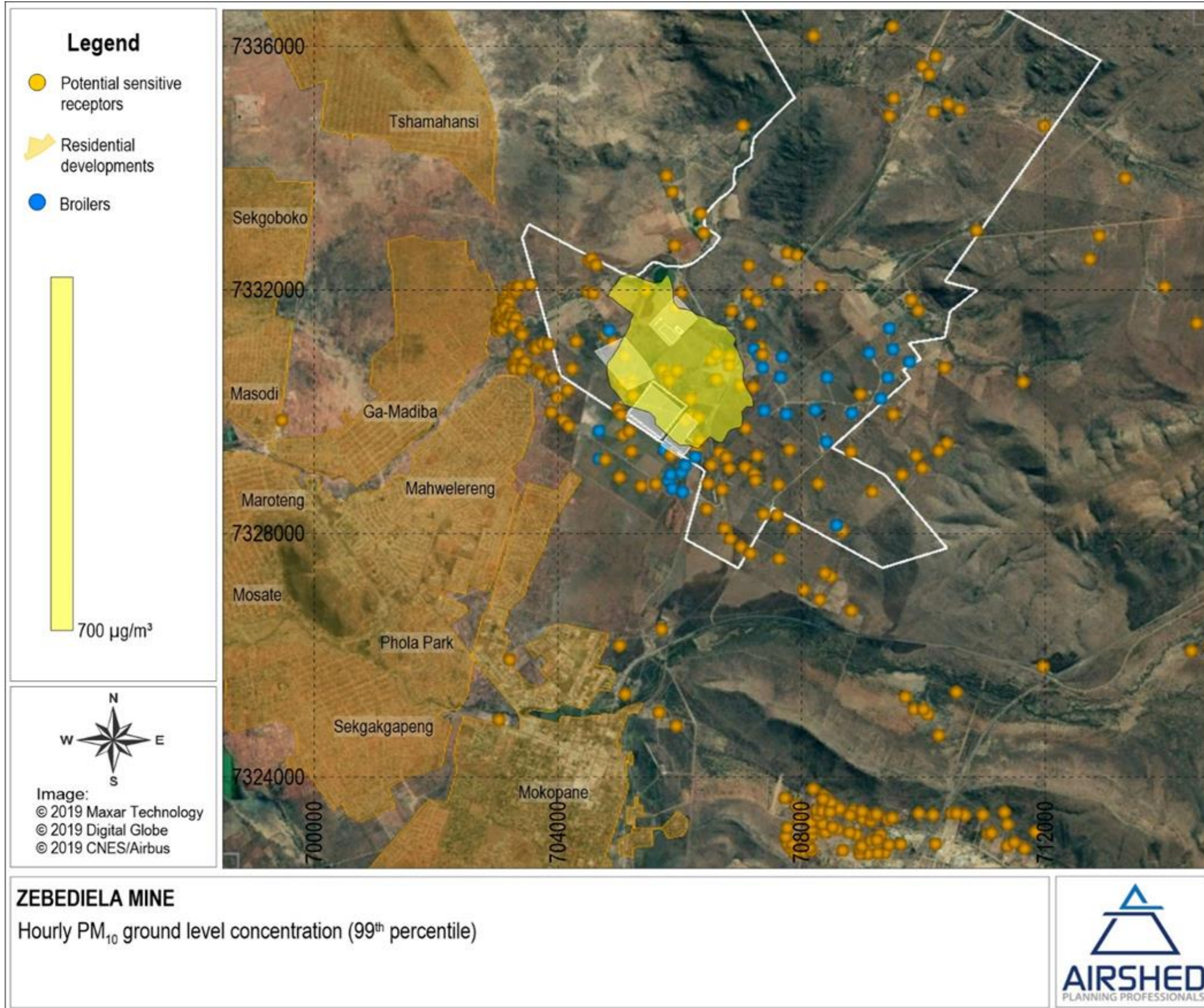
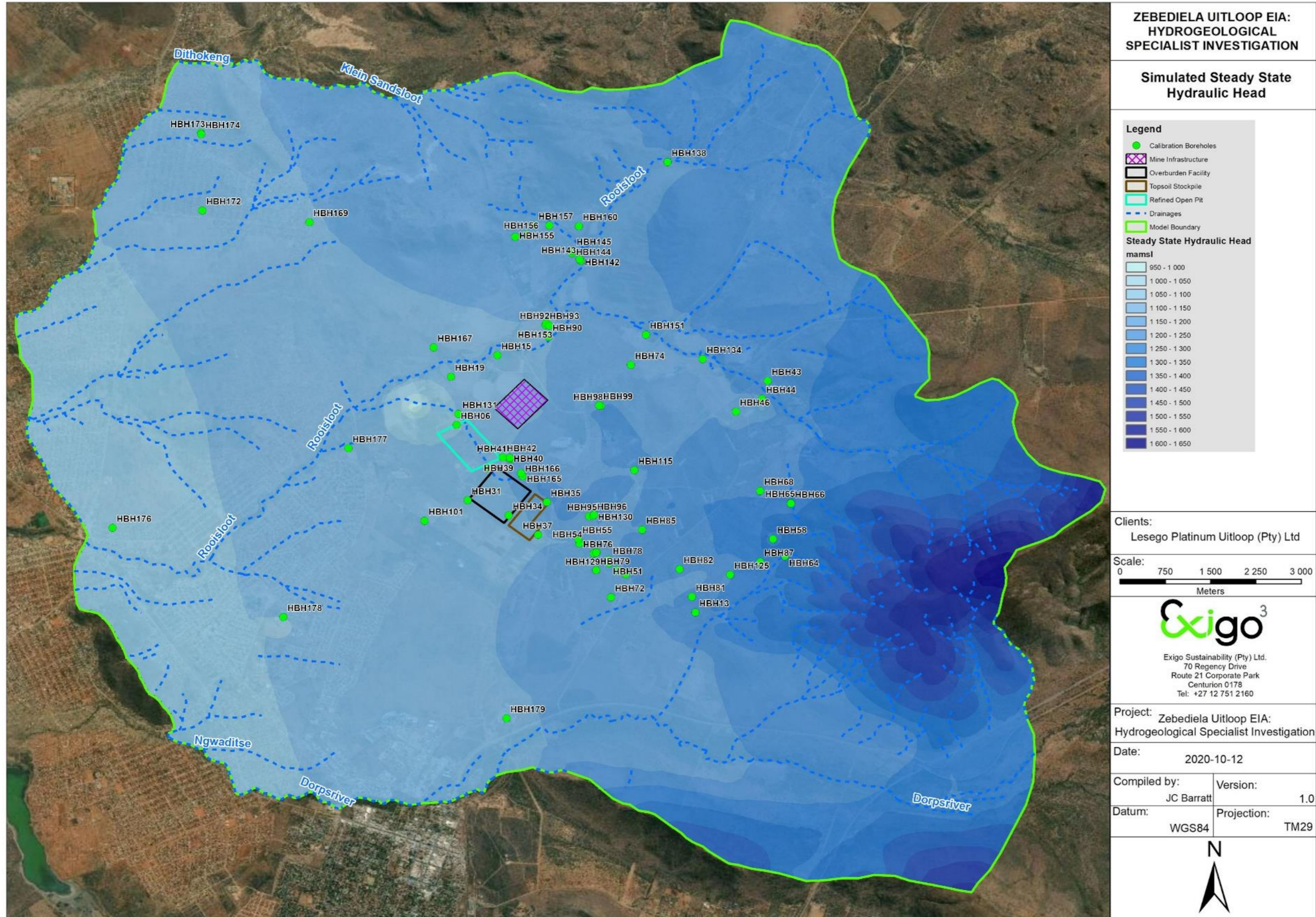


Figure 107: Area of non-compliance of PM10 NAAQS due to routine mitigated project operations, assuming 90% control efficiency on unpaved haul and access road and 50% control efficiency on crushing activities (scenario: hauling of ROM from the pit to the crusher plant via haul trucks)

78. APPENDIX 12: GROUNDWATER MODELLING MAPS



**ZEBEDIELA UITLOOP EIA:
HYDROGEOLOGICAL
SPECIALIST INVESTIGATION**

**Simulated Steady State
Hydraulic Head**

Legend

- Calibration Boreholes
- ▣ Mine Infrastructure
- ▣ Overburden Facility
- ▣ Topsoil Stockpile
- ▣ Refined Open Pit
- - - Drainages
- ▭ Model Boundary

**Steady State Hydraulic Head
mamsl**

| |
|---------------|
| 950 - 1 000 |
| 1 000 - 1 050 |
| 1 050 - 1 100 |
| 1 100 - 1 150 |
| 1 150 - 1 200 |
| 1 200 - 1 250 |
| 1 250 - 1 300 |
| 1 300 - 1 350 |
| 1 350 - 1 400 |
| 1 400 - 1 450 |
| 1 450 - 1 500 |
| 1 500 - 1 550 |
| 1 550 - 1 600 |
| 1 600 - 1 650 |

Clients:
Lesego Platinum Uitloop (Pty) Ltd

Scale:
0 750 1 500 2 250 3 000
Meters

Exigo³
Exigo Sustainability (Pty) Ltd.
70 Regency Drive
Route 21 Corporate Park
Centurion 0178
Tel: +27 12 751 2160

Project: Zebediela Uitloop EIA:
Hydrogeological Specialist Investigation

Date: 2020-10-12

| | |
|----------------------------|---------------------|
| Compiled by: JC Barratt | Version: 1.0 |
| Datum: WGS84 | Projection: TM29 |

N
↑

Figure 108: Simulated steady-state hydraulic head

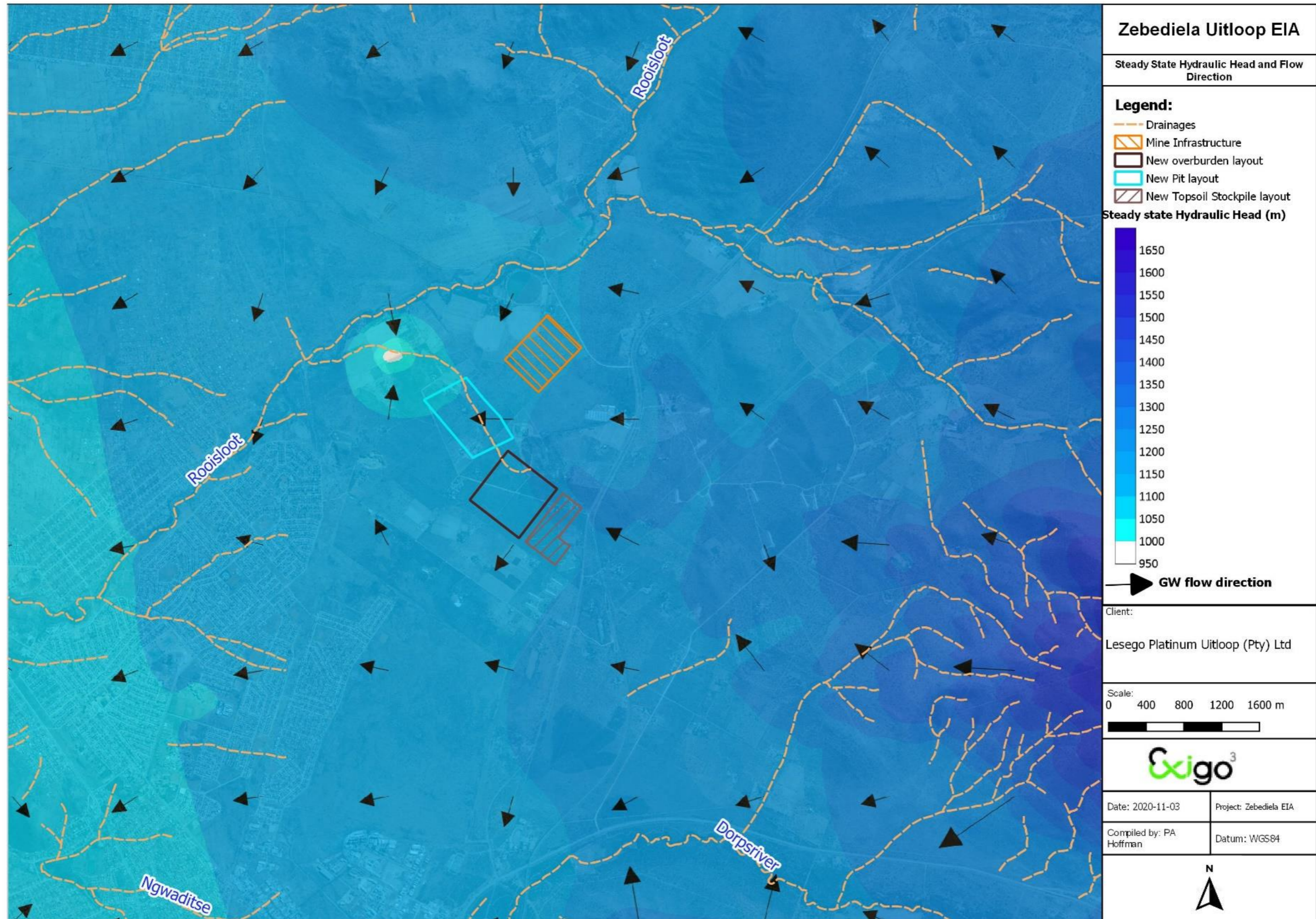


Figure 109: Steady-state simulated hydraulic head and groundwater flow direction

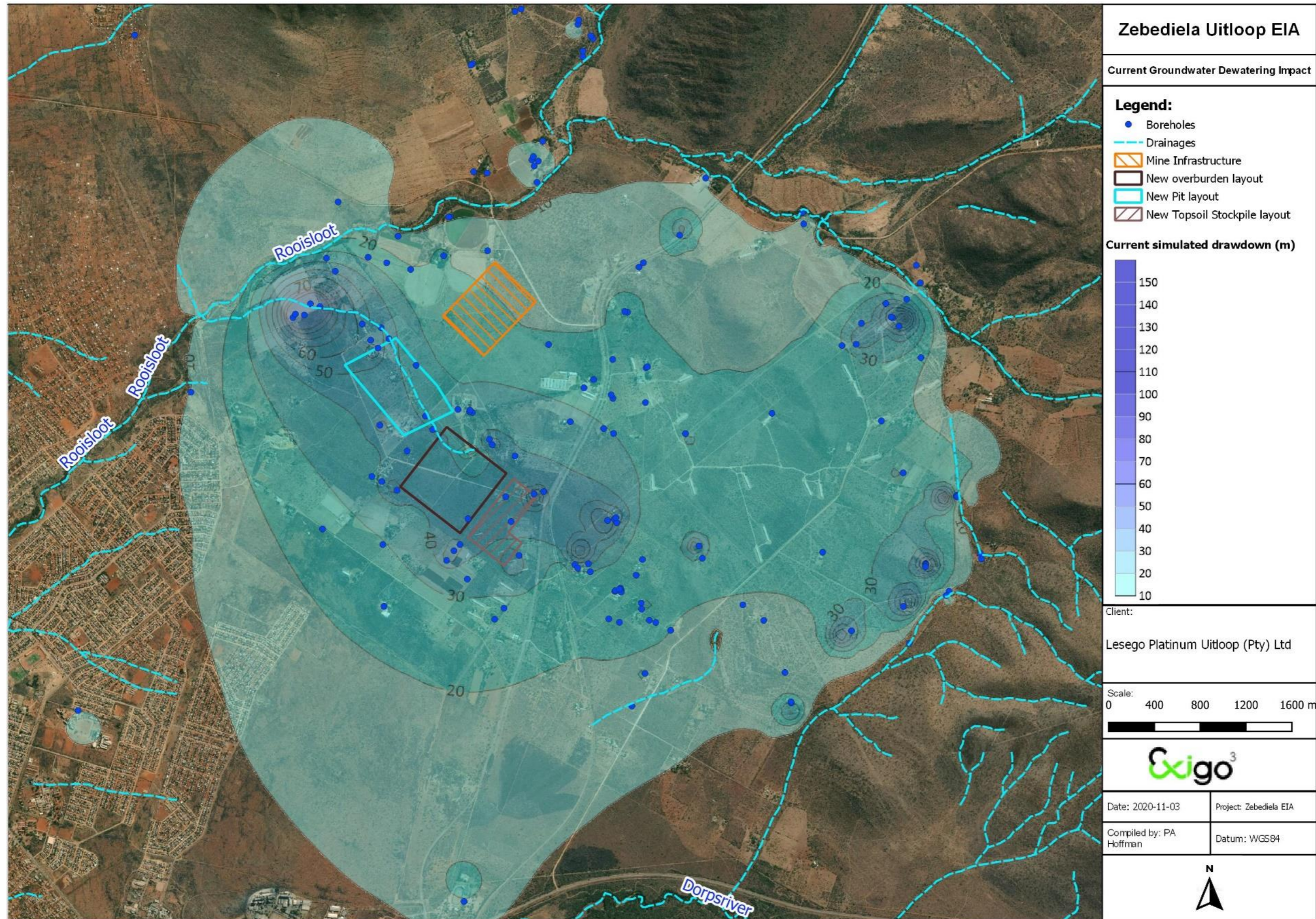


Figure 110: Current 2020 simulated groundwater dewatering impact-Pre mining

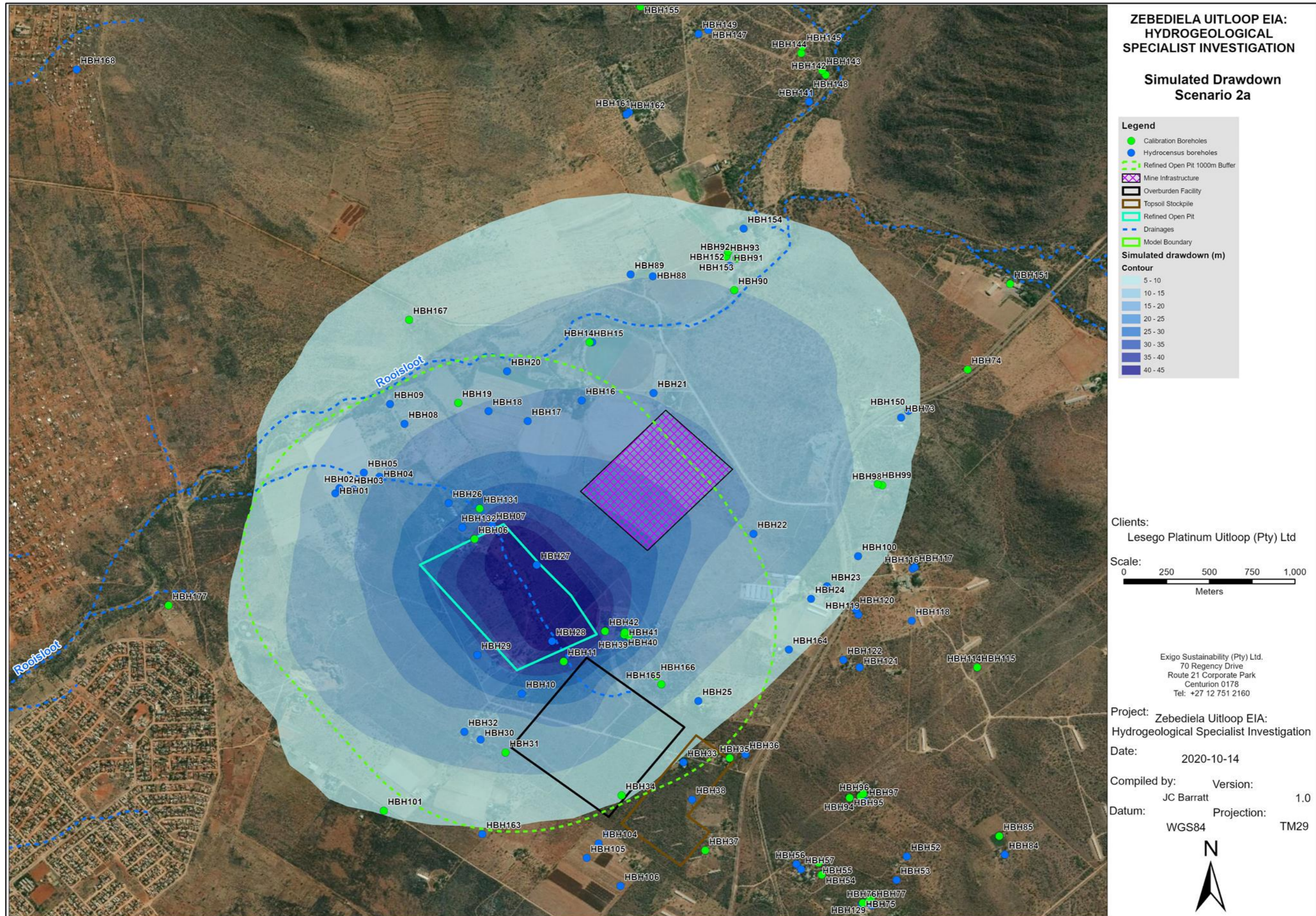


Figure 111: Scenario 2a's simulated ROI during the LoM operational phase

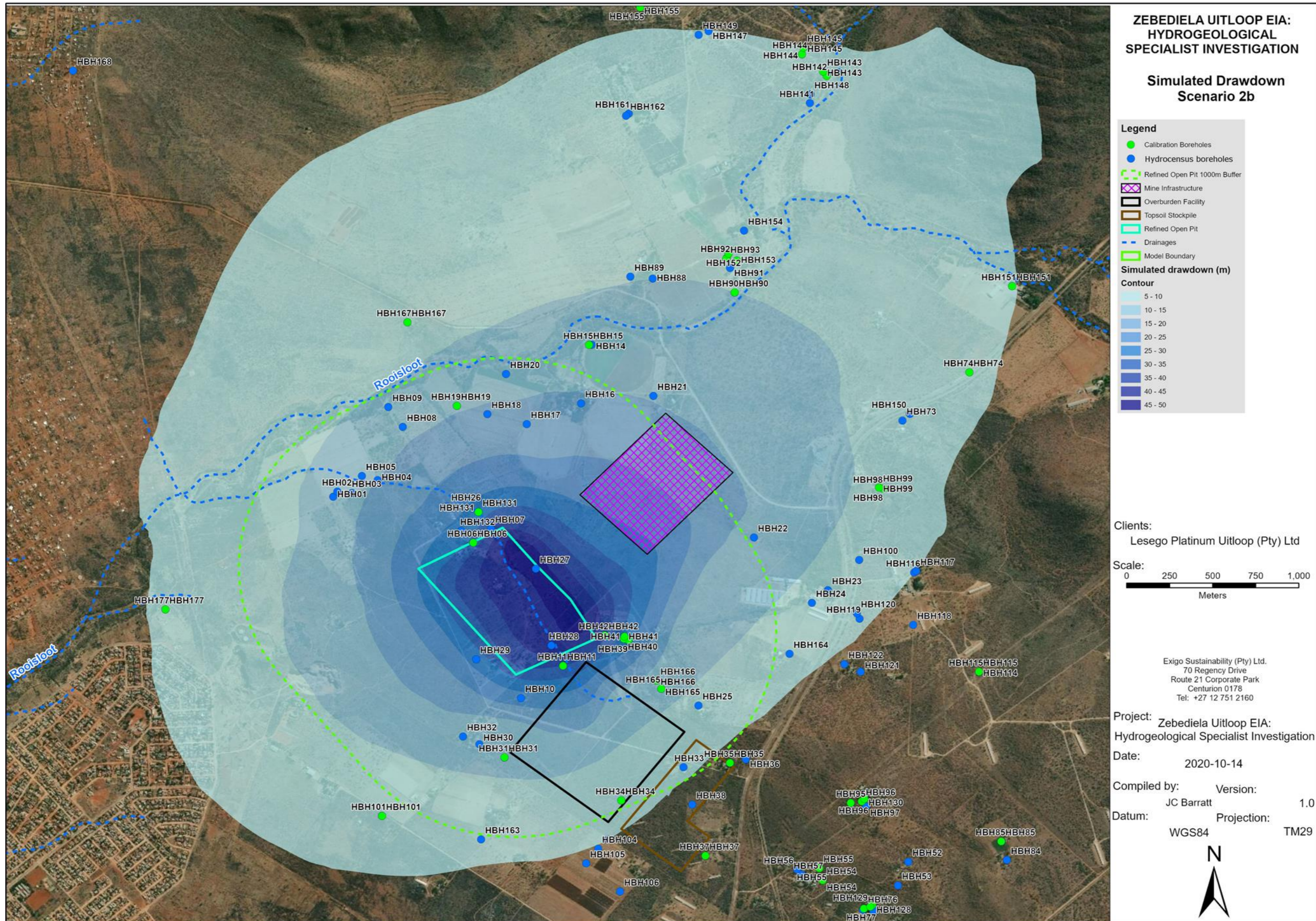


Figure 112: Scenario 2b's simulated ROI during the LoM operational phase

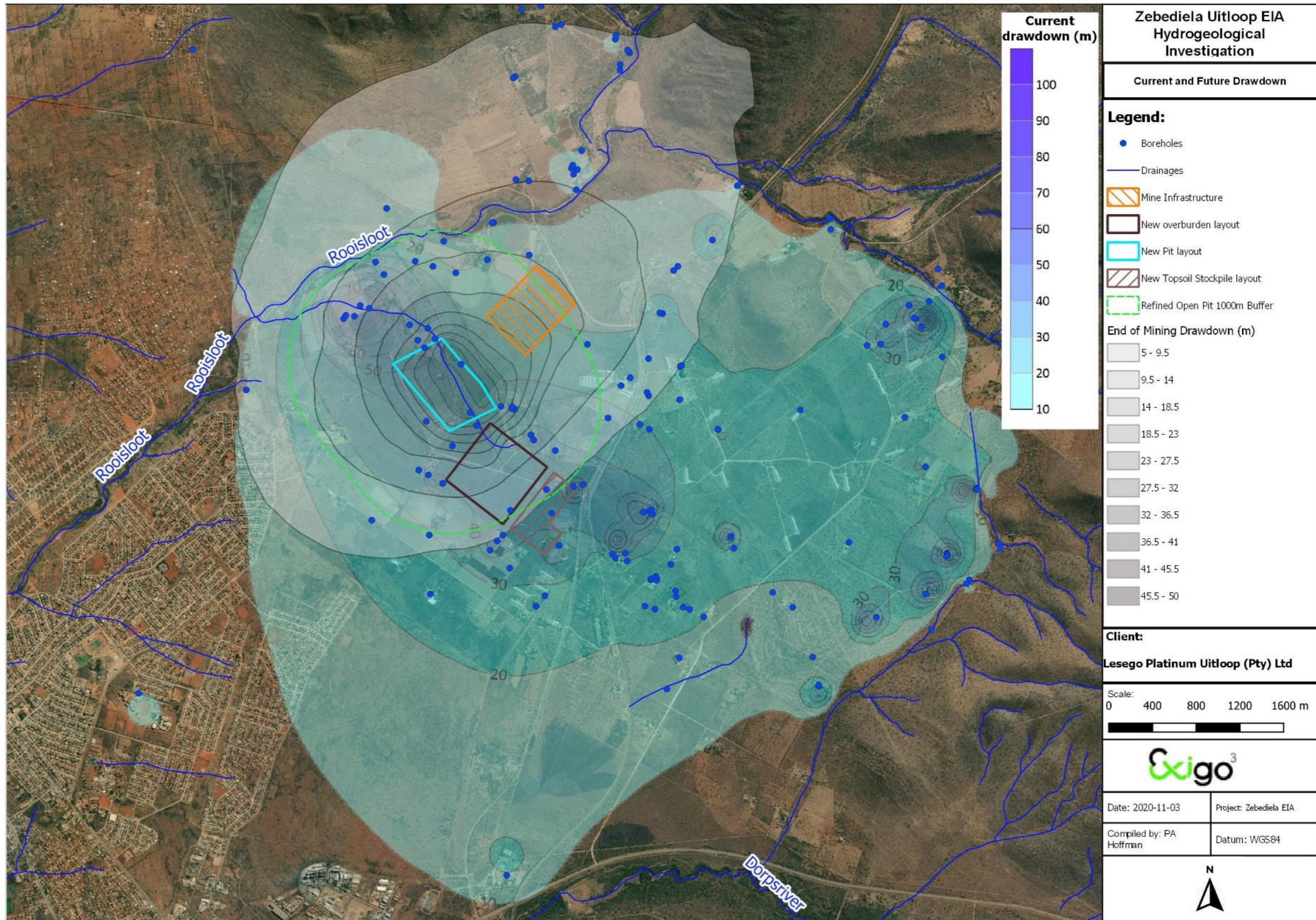


Figure 113: Current and future mine dewatering impact zones

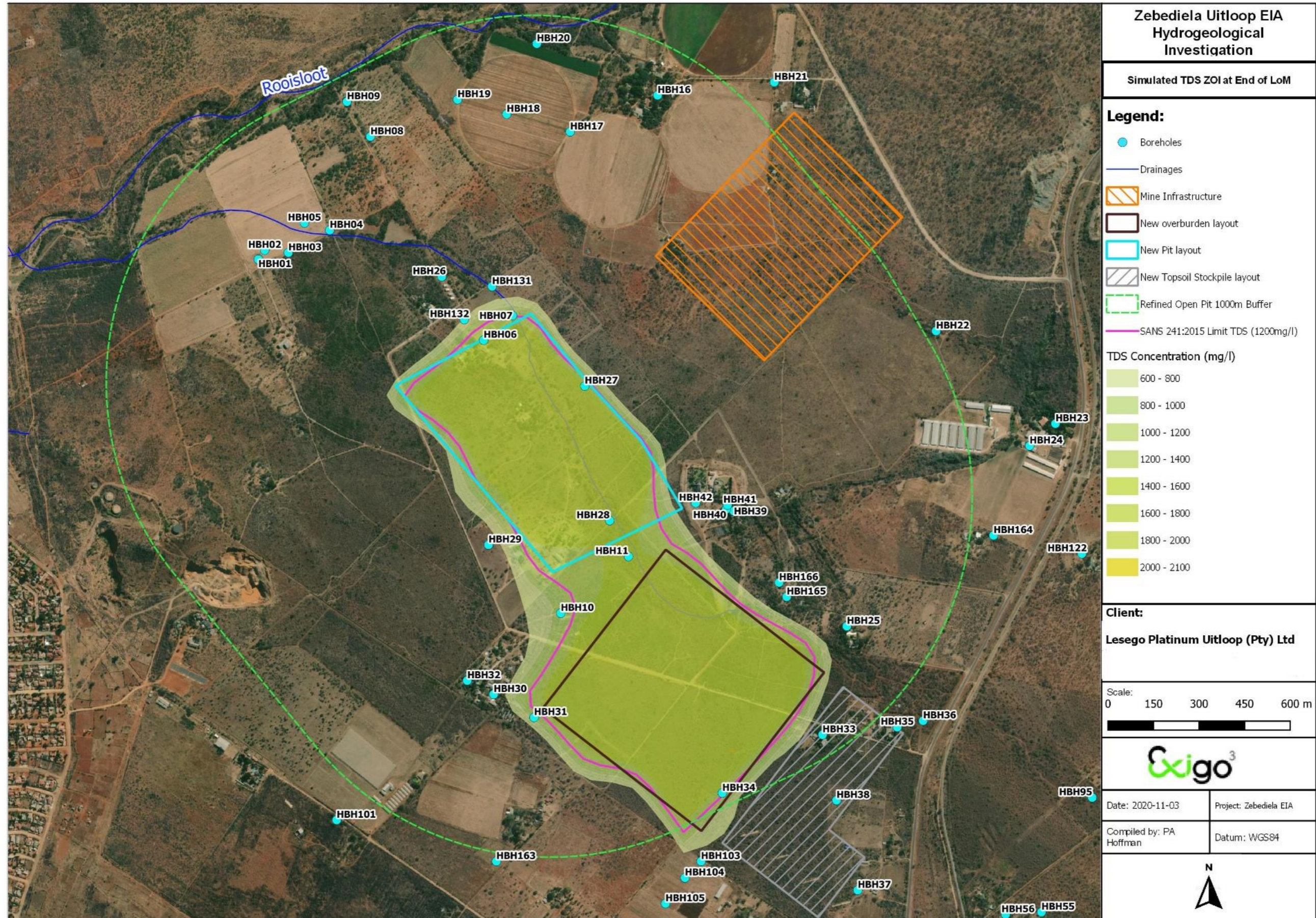


Figure 114: Simulated unmitigated TDS ZOI during LoM

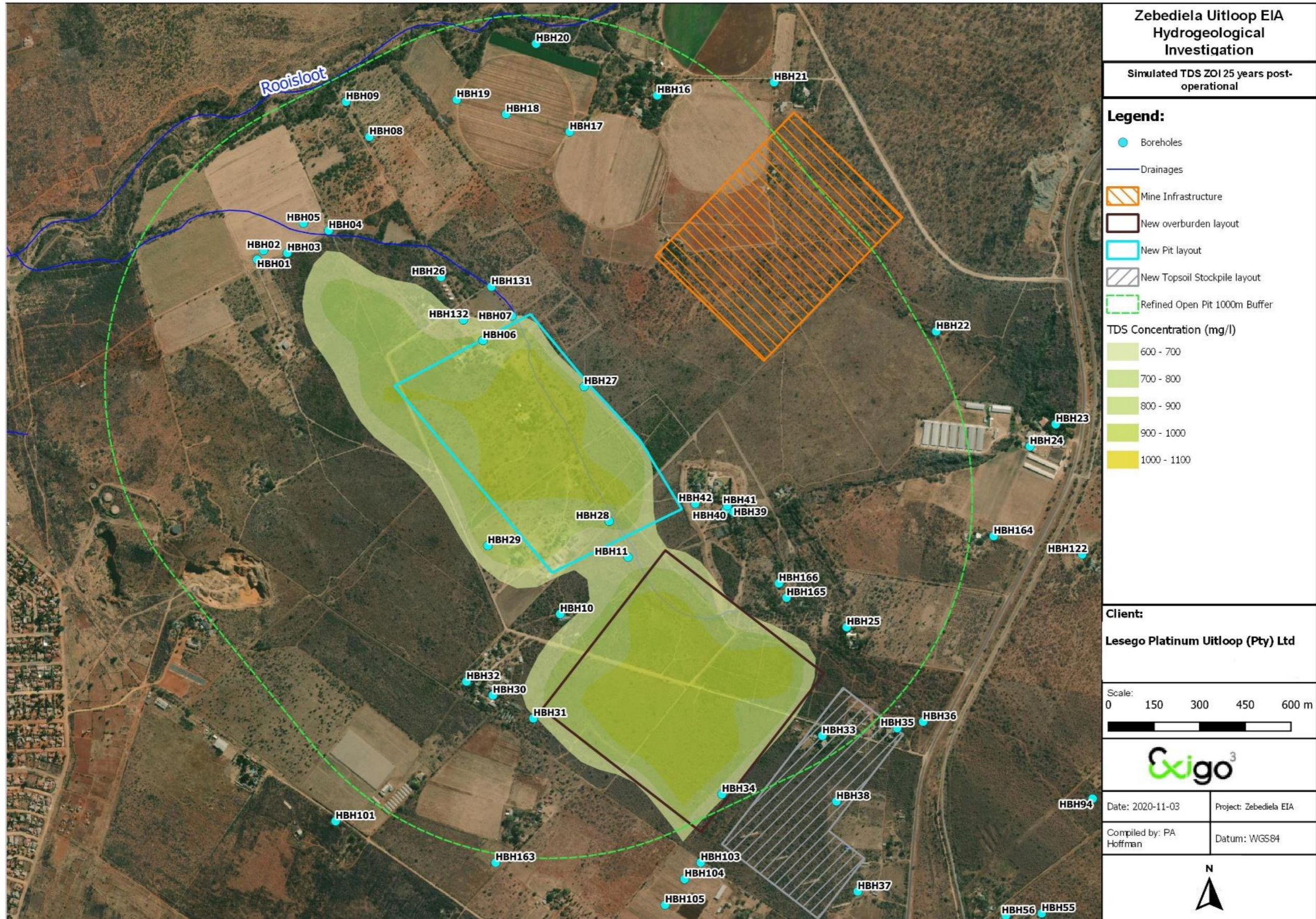


Figure 115: Simulated unmitigated TDS ZOI 25 years post-operational

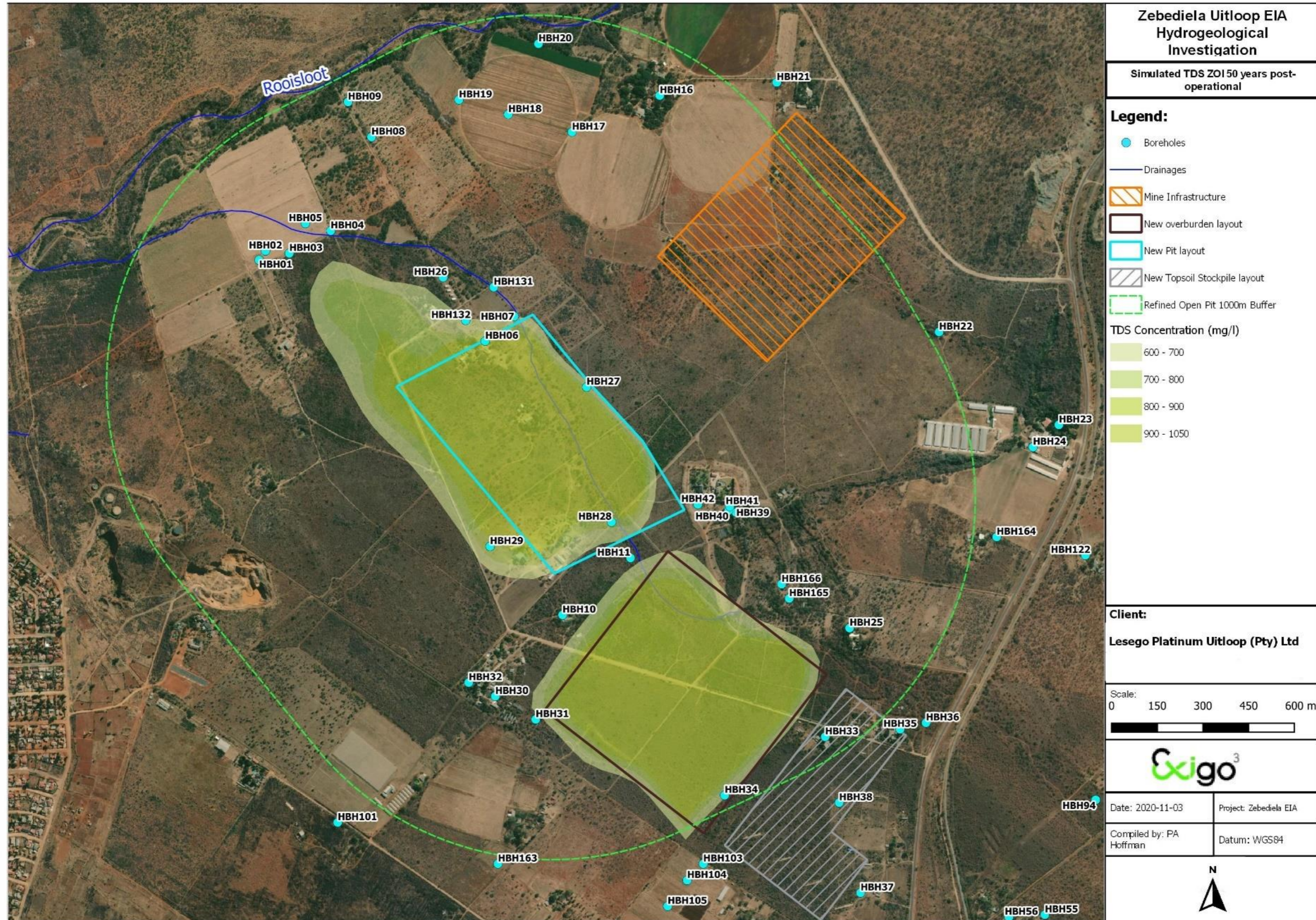


Figure 116: Simulated unmitigated TDS ZOI 50 years post-operational

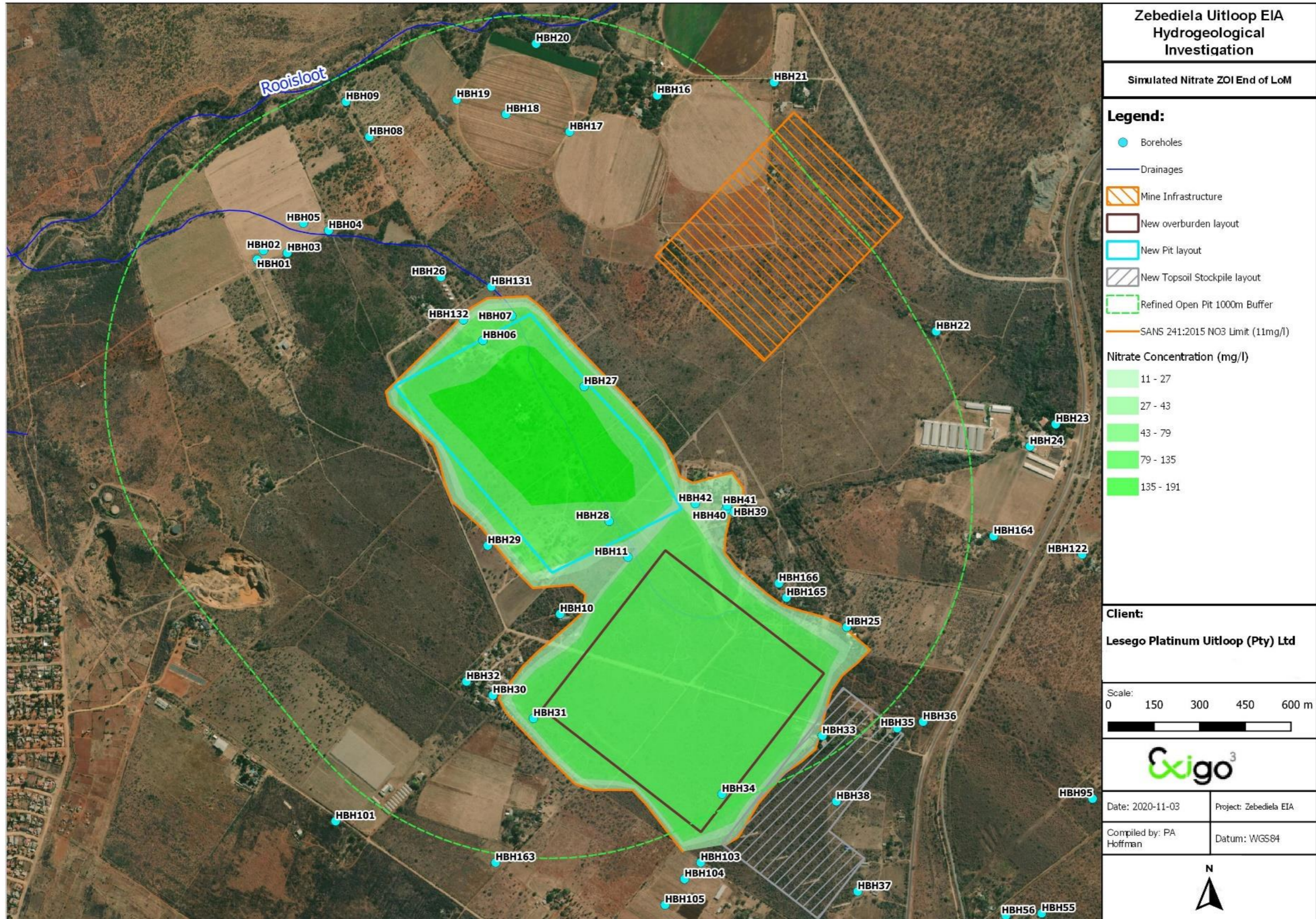


Figure 117: Simulated nitrate ZOI during LoM

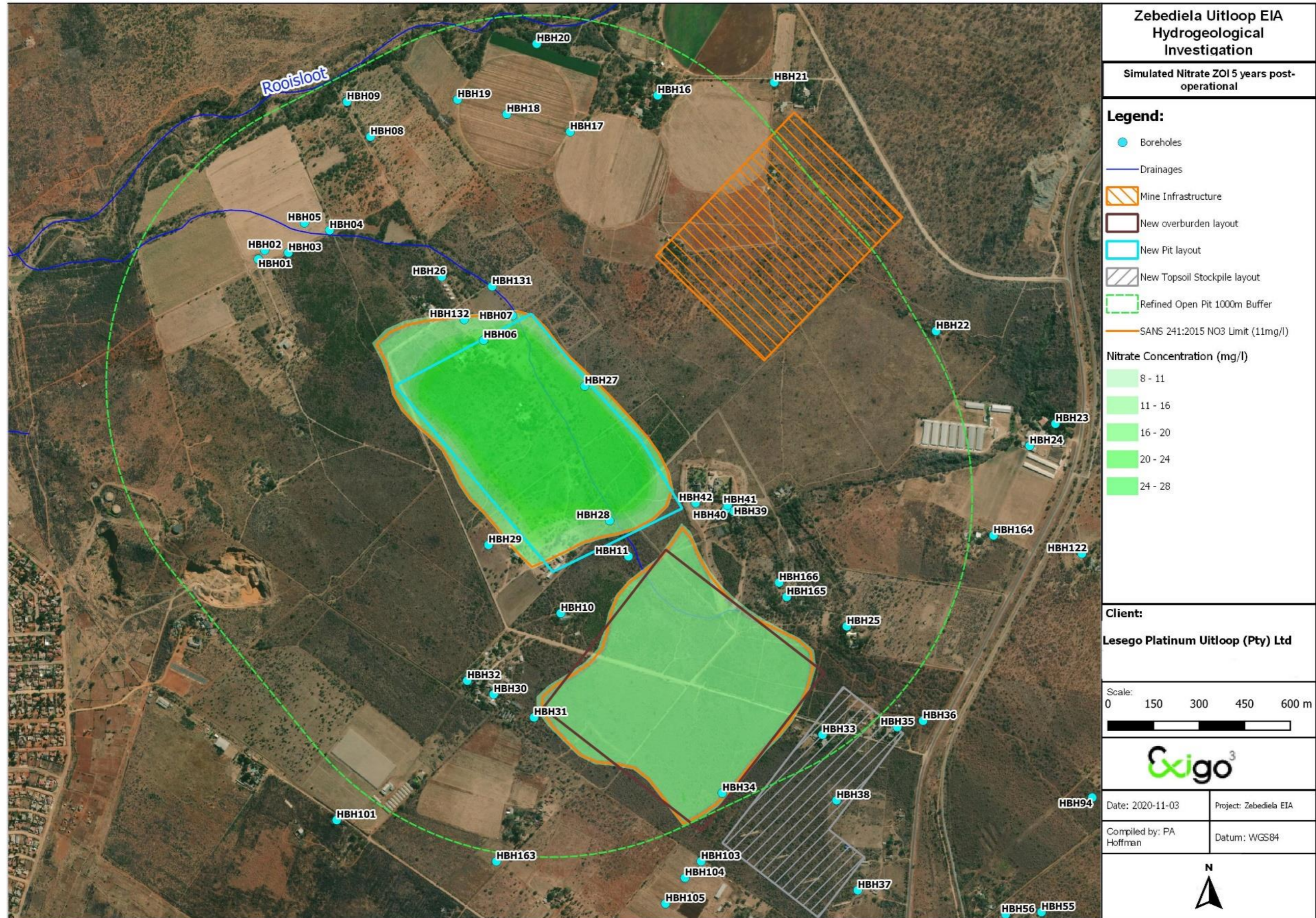


Figure 118: Simulated nitrate ZOI 5 years post-operational

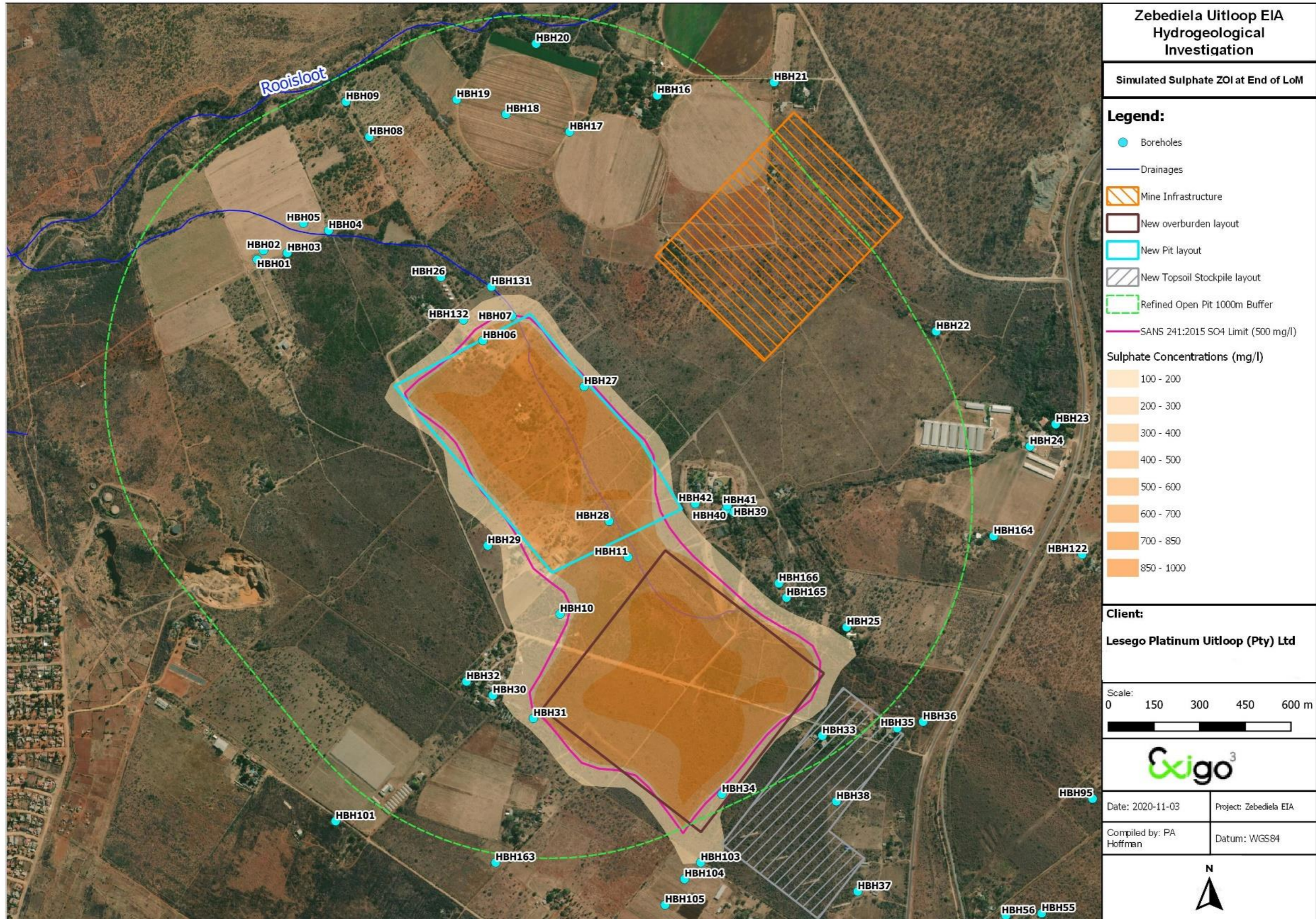


Figure 119: Simulated unmitigated sulphate ZOI during LoM

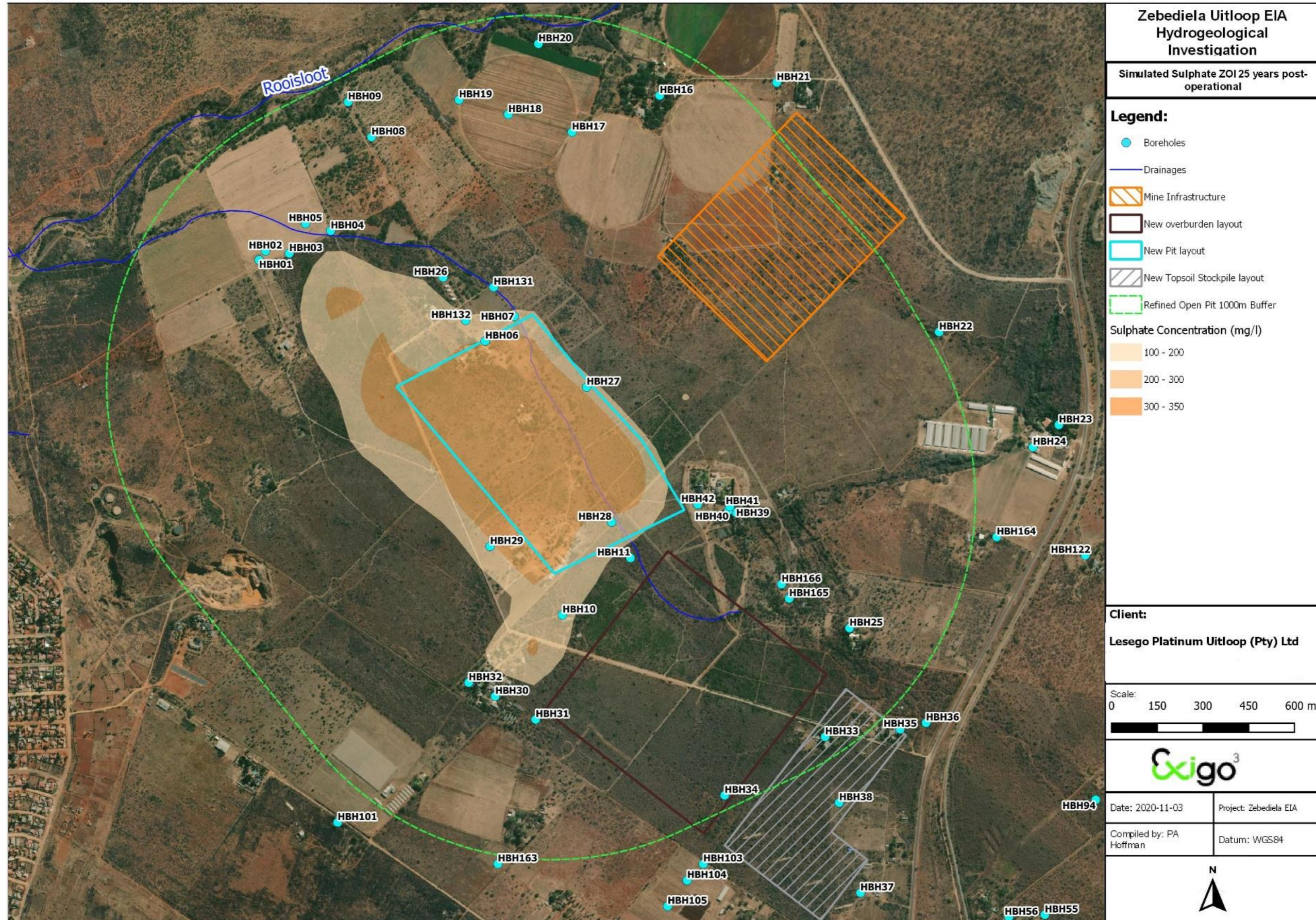


Figure 120: Simulated unmitigated sulphate ZOI 25 years post-operational

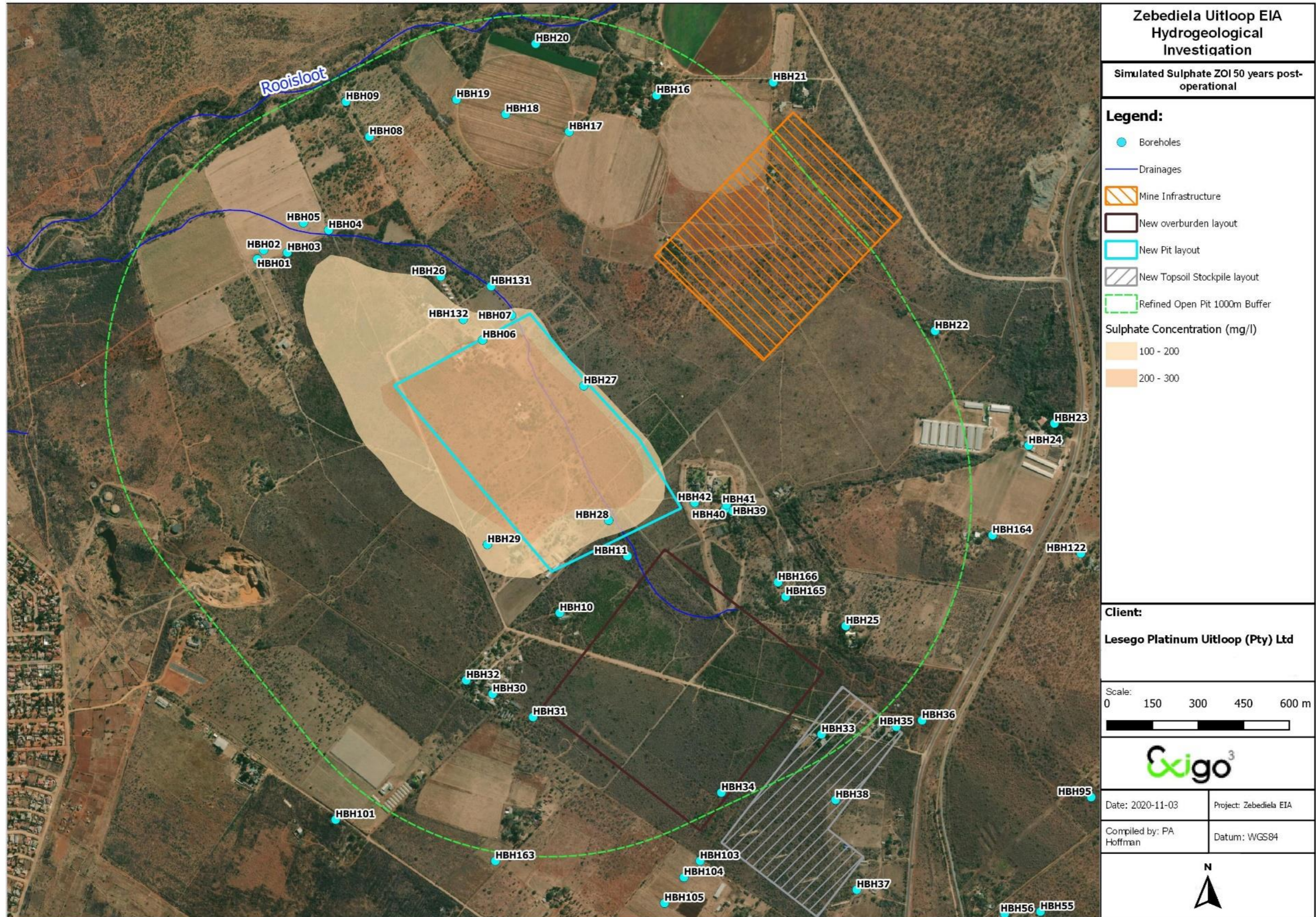


Figure 121: Simulated unmitigated sulphate ZOI 50 years post-operational

79. APPENDIX 13: ENGINEERING SWMP AND WASTE MANAGEMENT FACILITY DESIGN

