XPANDAcell Repeaters

Carrier Class Solutions to Expand Your Cellular Coverage

http://www.xpandacell.com

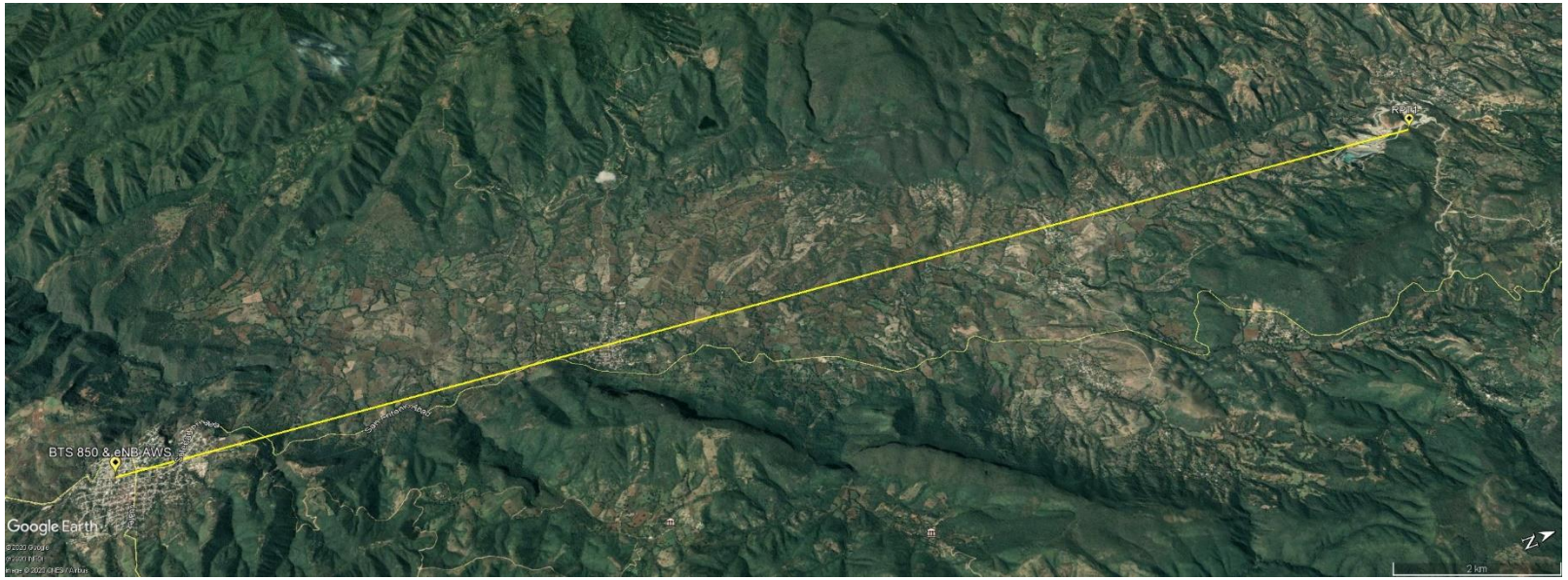
What it does

- RPT-9000 solves coverage problem
- Repeats LTE/UMTS/CDMA/GSM signals from a cell site to target locations for local coverage
- Enables the Mobile Network Operator to:
  - Firm up coverage in fringe, low lying and limited reception areas
  - Selectively extend coverage
  - Provide coverage where the cost of a base station is not justifiable

Case Study – 3G on 850 MHz & 4G LTE on 1700/2100 MHz

- New Mining Operation in Mexico without adequate cell service
- 20 Km from the nearest Telcel tower
- Three sector design providing coverage to plant, administrative office and living areas
- Use of Standard Repeaters to extend HSPA+ and LTE service in order to provide voice, SMS and data to mobile devices around the mine

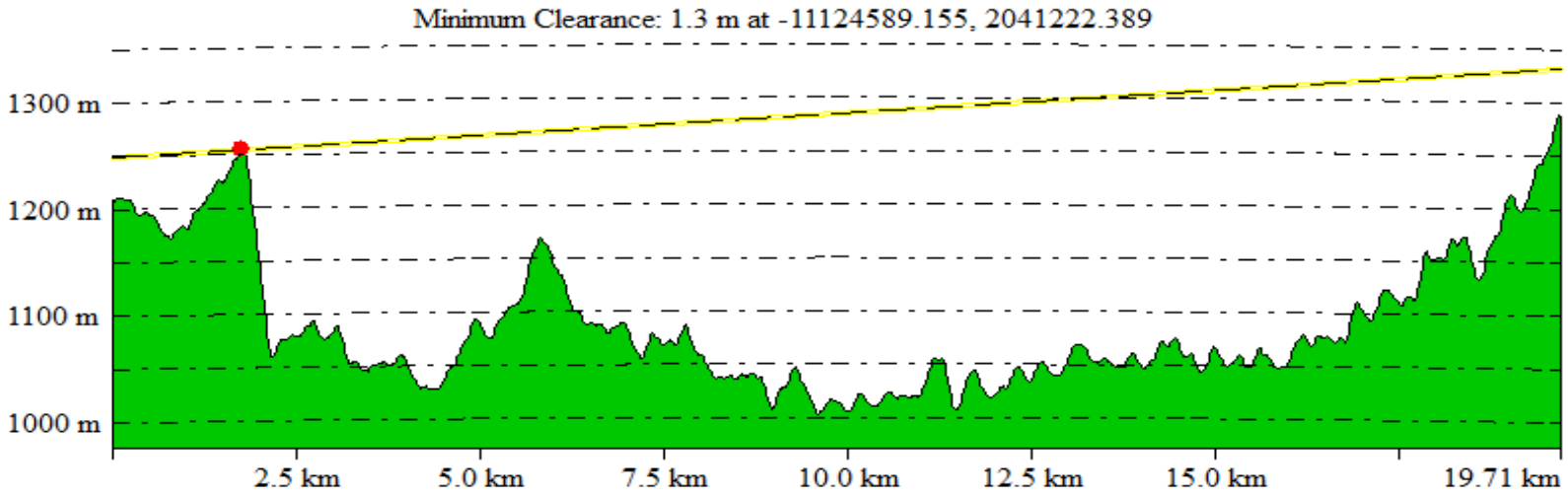
Case Study – 3G & 4G LTE



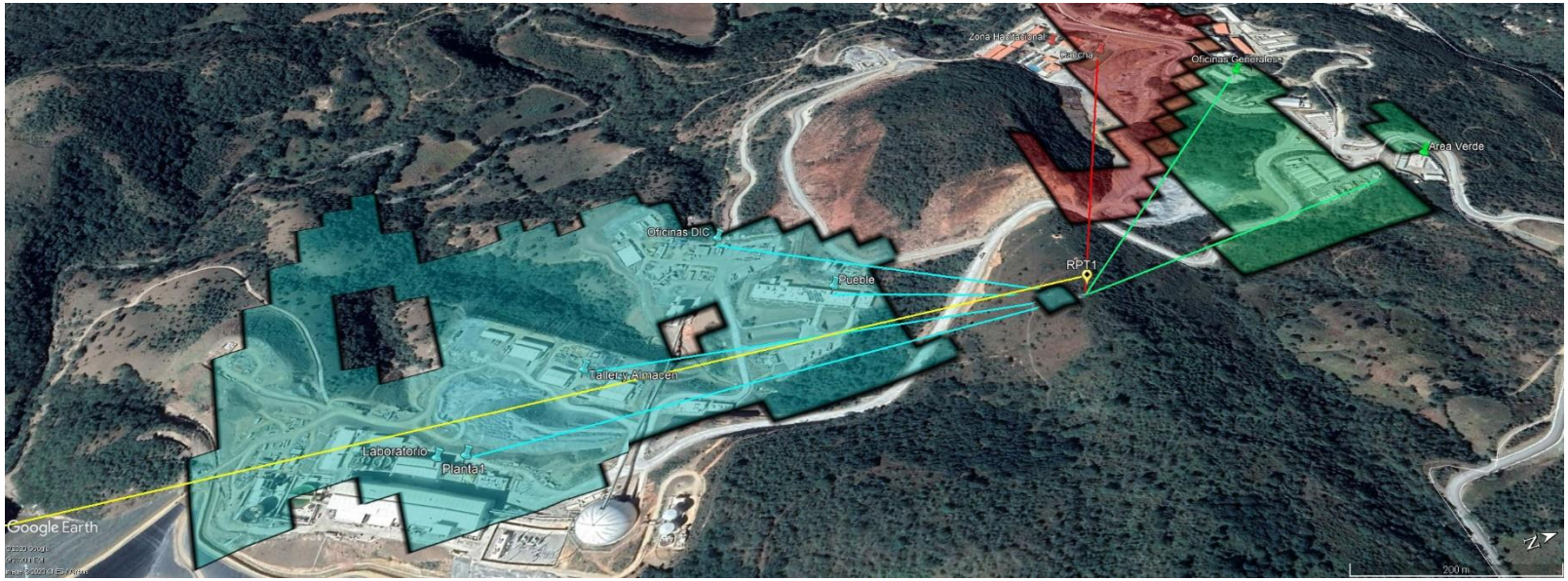
Example of Single Repeater Links providing coverage to Mining Area

- Cell Tower is located along a valley 20 Km to the south
- Band 5 (CLR) at 850 MHz for 3G HSPA+
- Band 4 (AWS-1) at 1700/2100 MHz for 4G LTE
- Line of site with minimum clearance at 2 Km from cell tower
- Requirement for 22 & 28 dBi high gain donor antennas at the top of a 45m tower
- Telcel signal now available for voice, SMS and data

Case Study – 3G & 4G LTE



Case Study – 3G & 4G LTE



Example of Single Repeater Links providing coverage to Mining Area

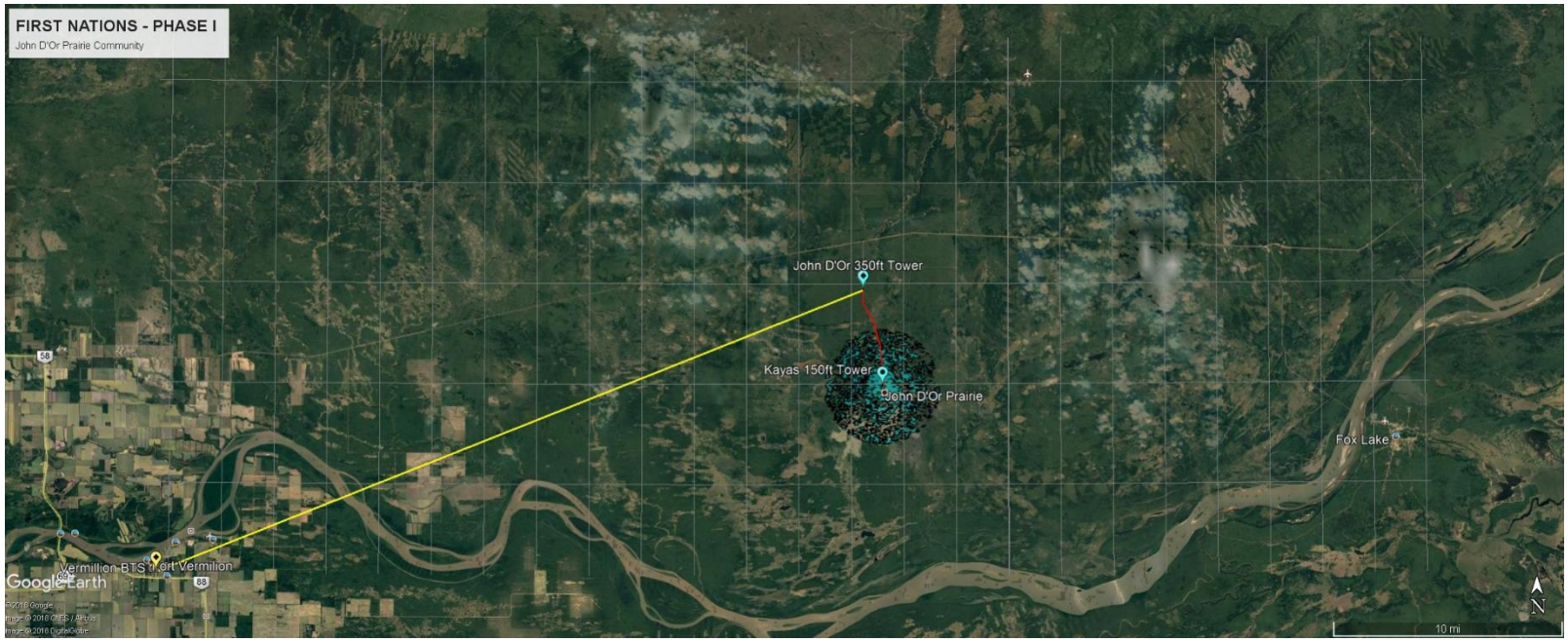
- Blue Sector – main plant, production and processing areas
- Green Sector – administrative offices and security station
- Red Area – living quarters, dining facilities and Futbol field
- 2m (6.6’) donor antennas at 43 & 44m height capture cell tower signal 20 Km away
- 1.2m (4’) 3G area fill antennas at 6m height facing in the three directions
- 0.6m (2’) 4G area fill antennas at 10m height facing in the same three directions

Case Study – 3G & 4G LTE

Case Study – 4G LTE on 850 MHz

- First Nations in Alberta, Canada
- Indian Reservations 50+ and 90+ Km from nearest Telus and Rogers cell towers
- Remote areas 1000 Km north of Calgary without any cell coverage for over 30 years
- Use of Standard and Hybrid Fibre Repeaters to extend LTE service on 850 MHz in order to provide voice, SMS and data to mobile devices throughout the communities

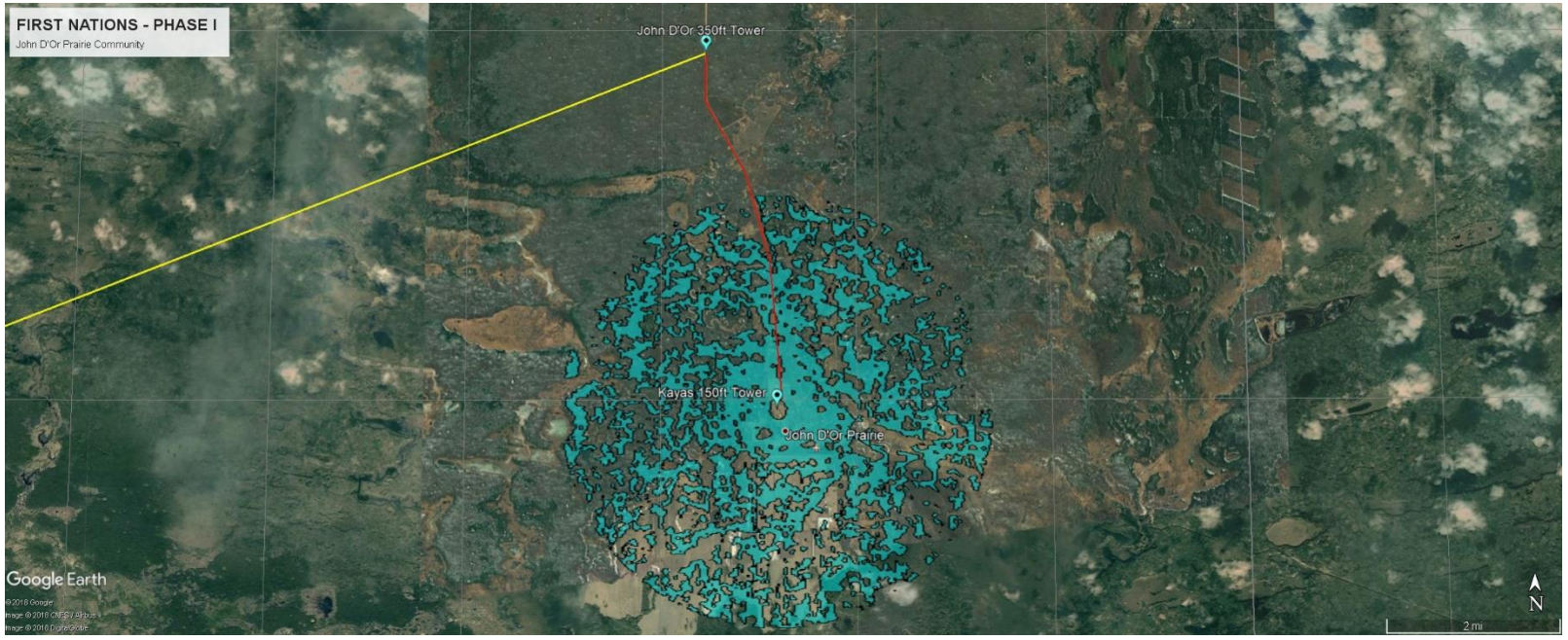
Case Study – Phase I

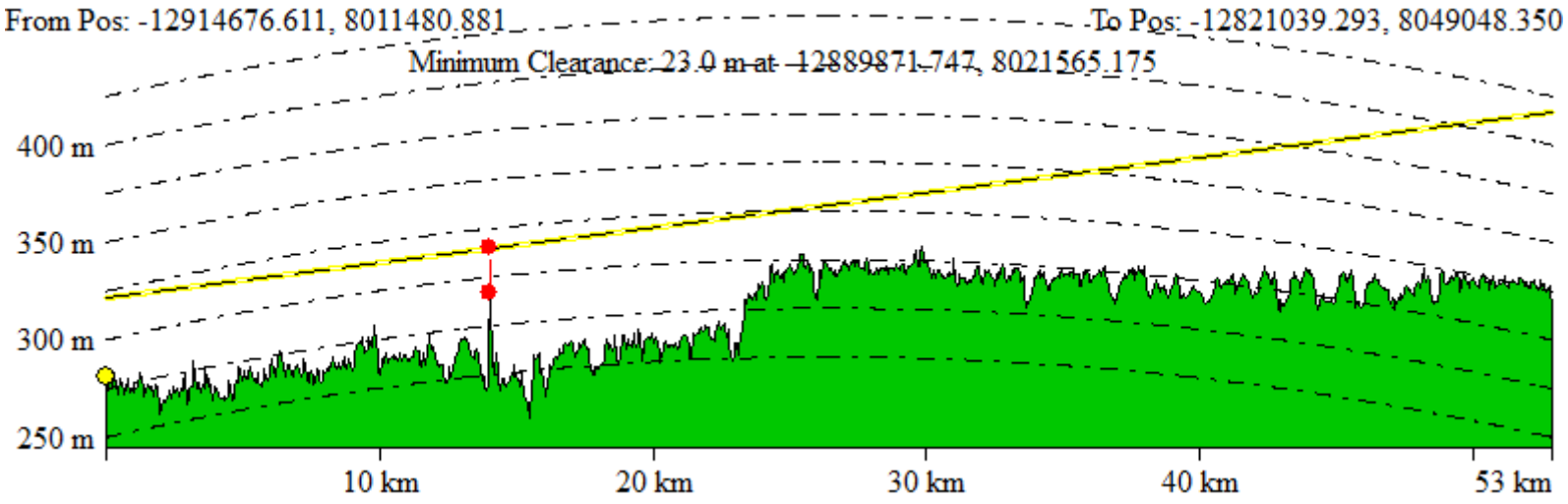


Example of hybrid repeater link providing coverage to Indian Reservation

- 850 MHz Cell Towers are located 53 Km from the main donor tower (Master location)
- Line of site at 350’ (106m) with 2m, high gain 22 dBi parabolic antenna
- 5 Km of single-mode fibre optic cable to John D’Or Prairie community (Slave location)
- 150’ (45m) area fill tower using 3 panel antennas for 360° coverage
- Telus and Rogers 4G LTE signal now available for voice, SMS and data

Case Study – Phase I



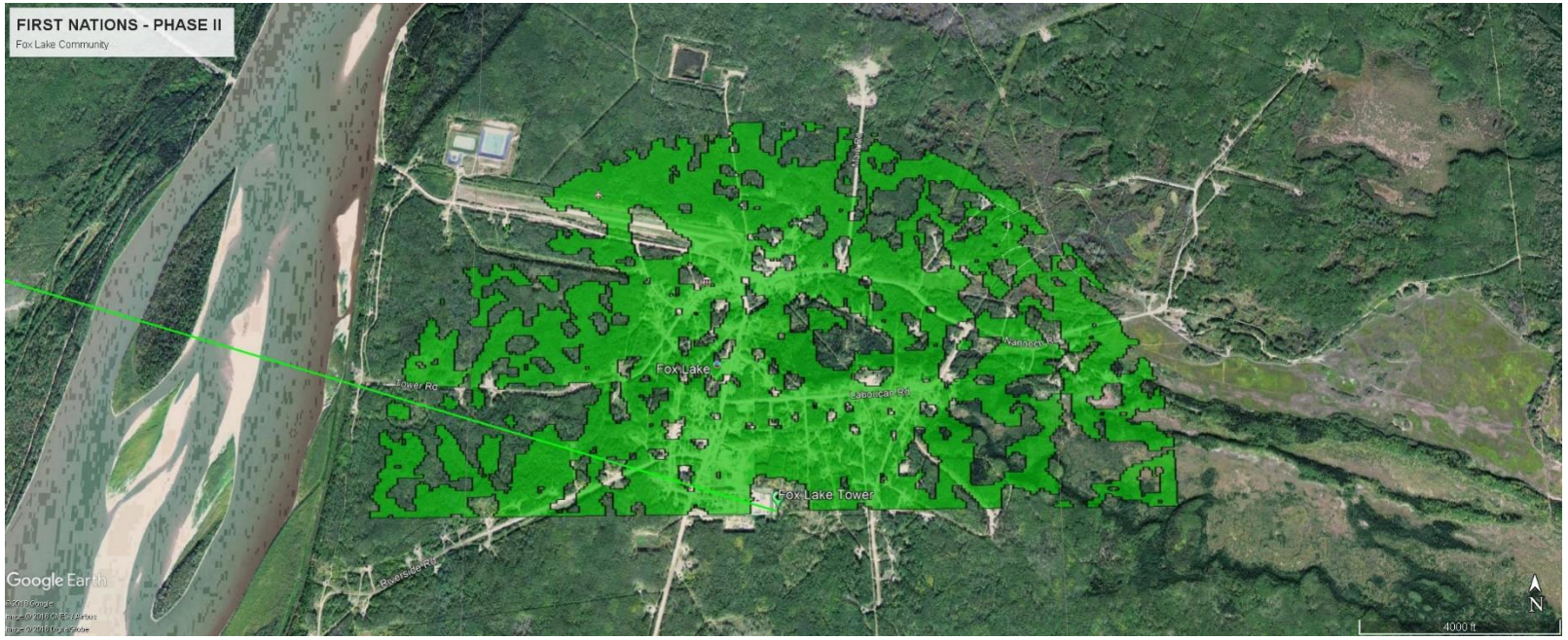


Case Study – Phase II

Example of dual repeater link delivering -65 dBm signal at remote reservation location

- Secondary Donor Tower is located 39 Km from the main donor tower (Master location)
- Line of site at 250’ (76m) with 2m high gain 22 dBi parabolic antenna
- Area fill height at 150’ (45m) using 3 panel antennas for 360° coverage
- Fox Lake community is 92 Km from cell tower
- Telus and Rogers 4G LTE signal now available for voice, SMS and data

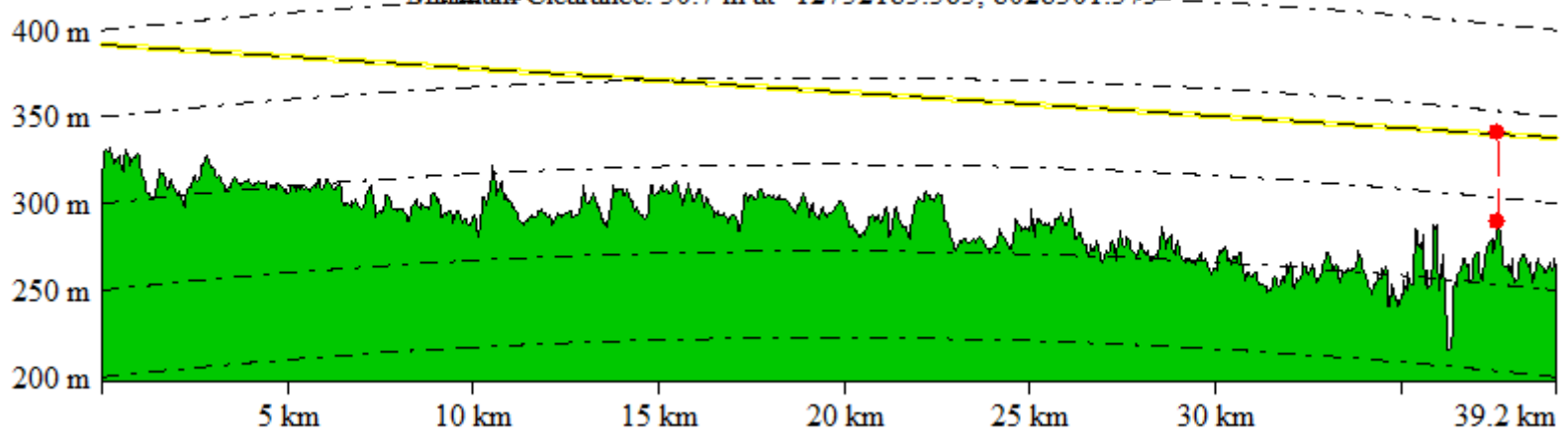
Case Study – Phase II



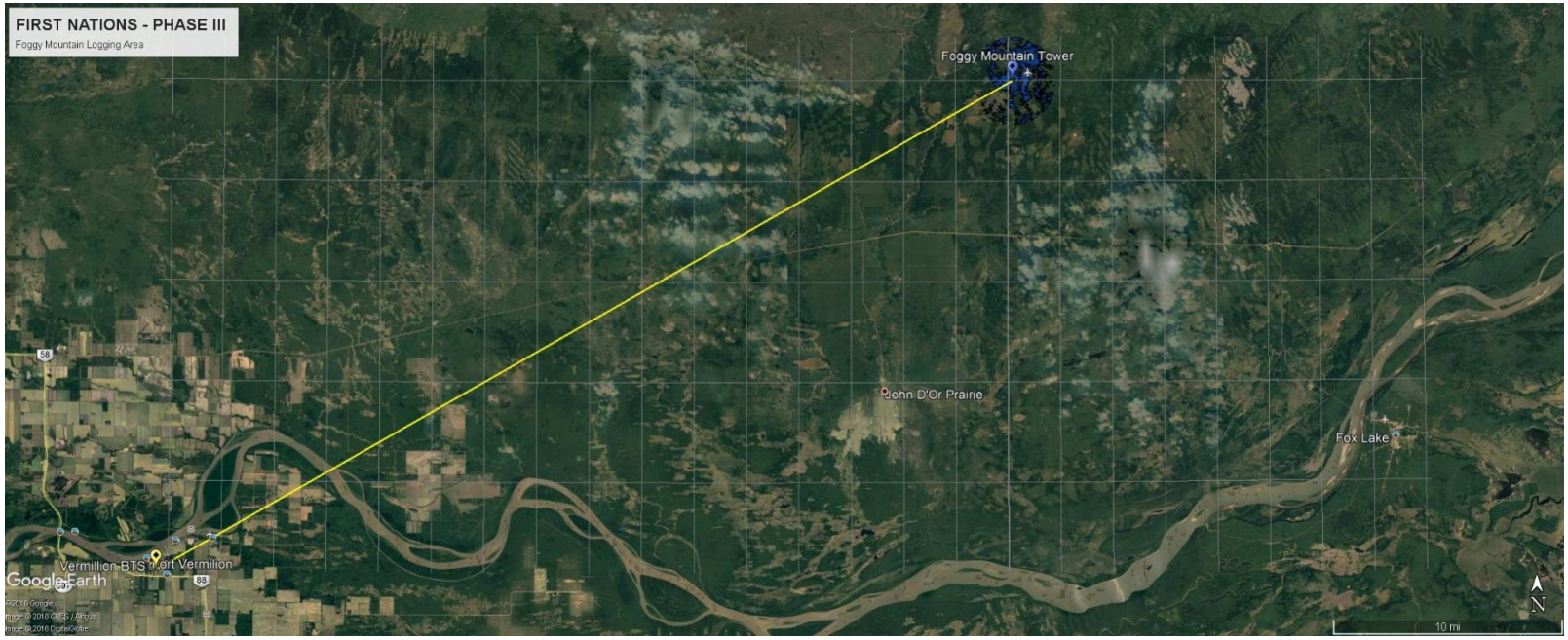
From Pos: -12821039.293, 8049048.350

To Pos: -12749391.905, 8027444.982

Minimum Clearance: 50.7 m at -12752185.565, 8028301.373



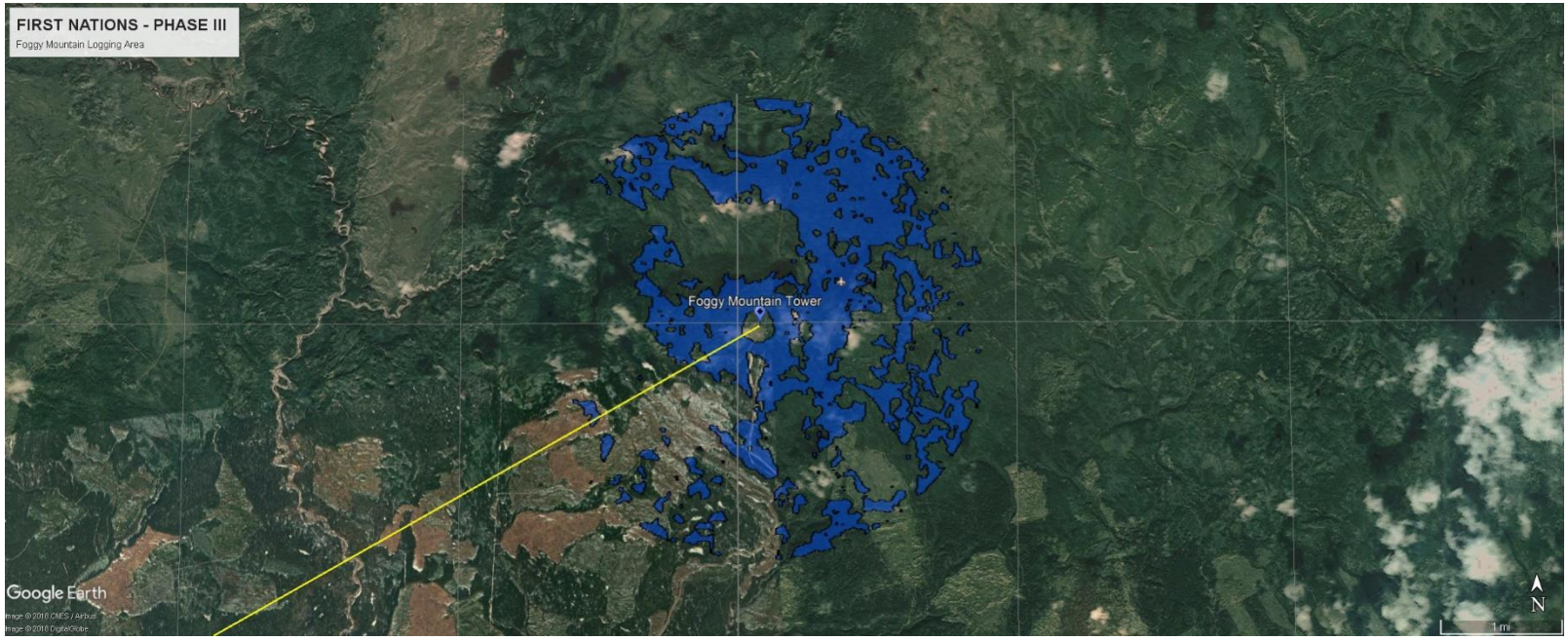
Case Study – Phase III



Example of standard repeater Link providing coverage to logging area

- 850 MHz Cell Towers are located 68 Km from the donor tower
- Line of site at 250’ (76m) with 2m high gain 22 dBi parabolic antenna
- 150’ (45m) area fill using 3 panel antennas for 360° coverage
- Area now covers 40-50 square Km along gravel roads on Foggy Mountain
- Telus and Rogers 4G LTE signal now available for voice, SMS and data

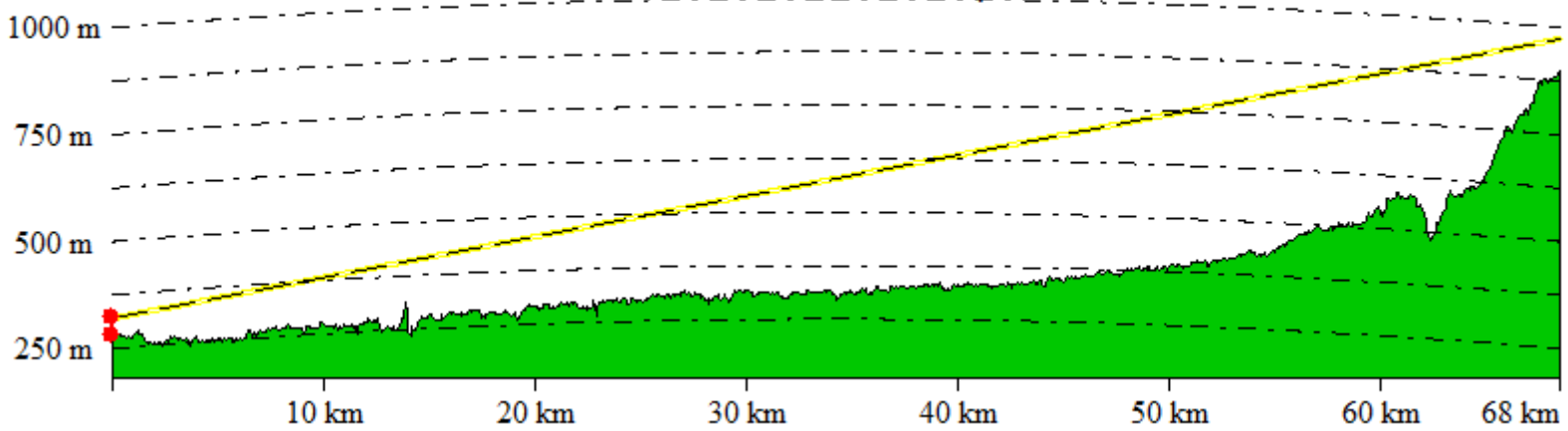
Case Study – Phase III



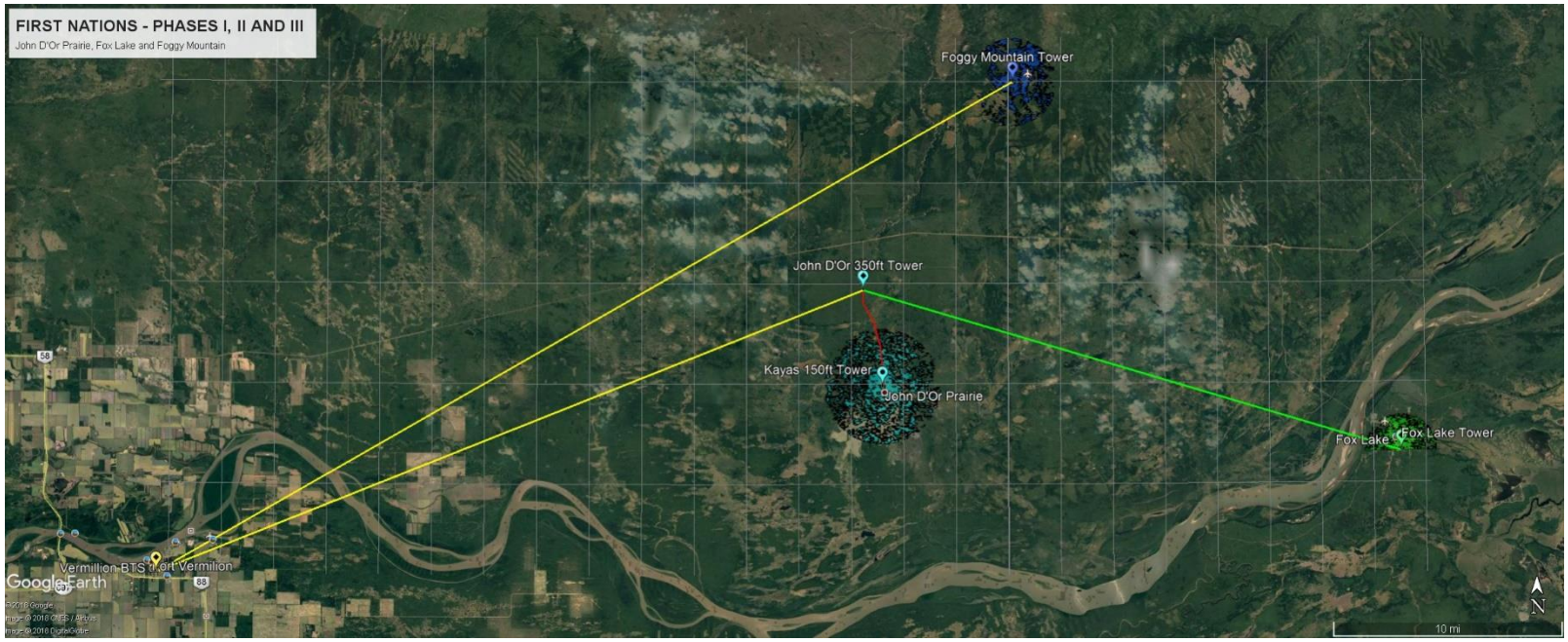
From Pos: -12914676.611, 8011480.881

To Pos: -12801173.093, 8076502.968

Minimum Clearance: 40.0 m at -12914676.611, 8011480.881



Case Study – Phases I, II and III



Example of multiphase project providing cell coverage at remote reservation locations

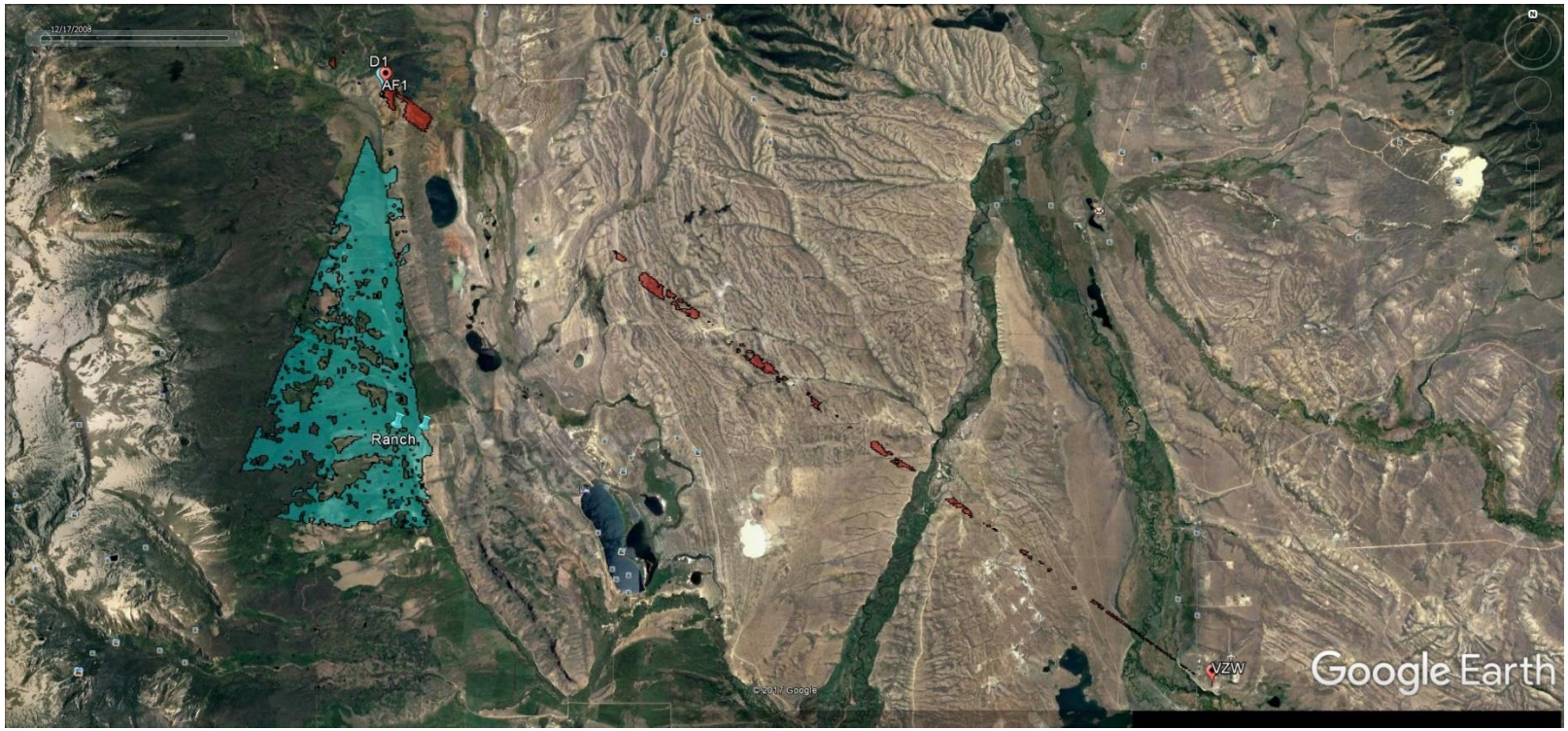
- Fort Vermilion is closest location with Telus and Rogers cell towers
- No direct line of site to John D'Or Prairie community
- Use of alternate donor tower site to the north and fibre to area fill tower
- Secondary link to Fox Lake community taking signal from first link
- Direct line of site to Foggy Mountain logging area
- 4G LTE signal now available to First Nations community (Summer/Fall 2018)

Case Study – 4G LTE on 850 MHz

Case Study – Single Repeater Link

- Western U.S. Ranch 24 Km from nearest cell tower
- Remote area - no coverage at ground level throughout valley
- Use of VHF two-way radios
- Need for cell service to facilitate better communications around the main ranch locations, cabins and field along valley

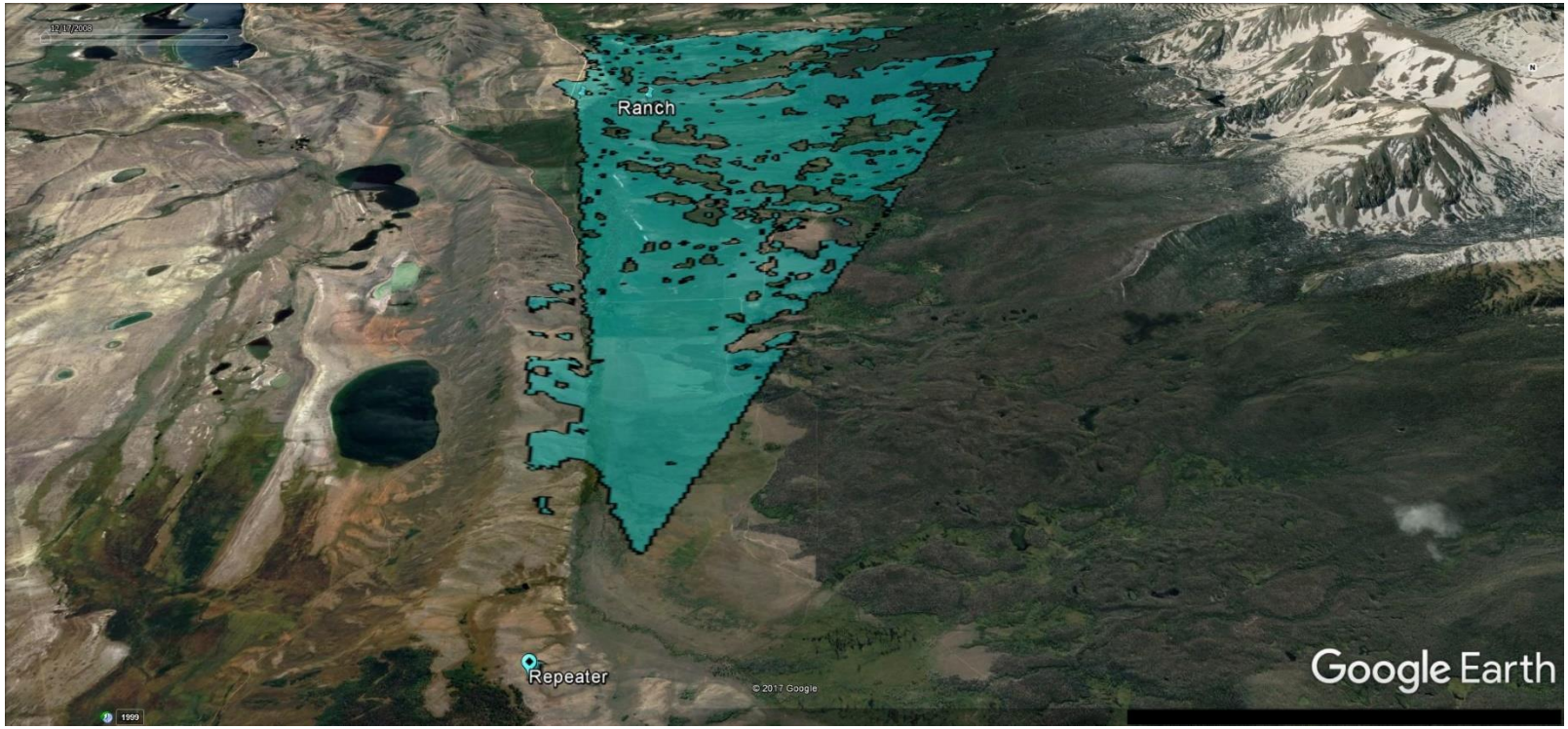
Case Study – Single Repeater Link



Example of Single Repeater Link providing coverage to Ranch and Farm

- 850 MHz Cell Tower is located 28 Km to the southeast of the property
- No cell coverage at ground level due to hills to the east of the valley
- Line of site from the north where the repeater is located
- Verizon Wireless signal available for voice, SMS and data

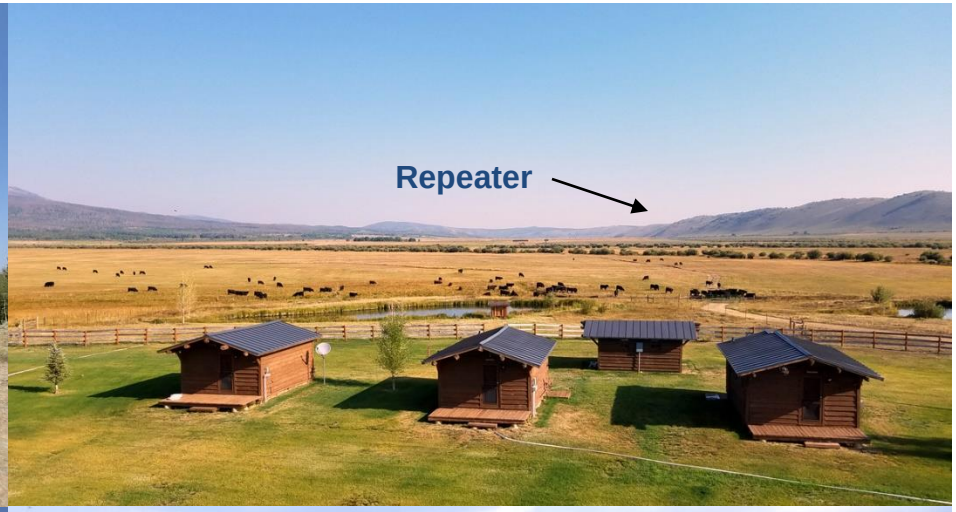
Case Study – Single Repeater Link

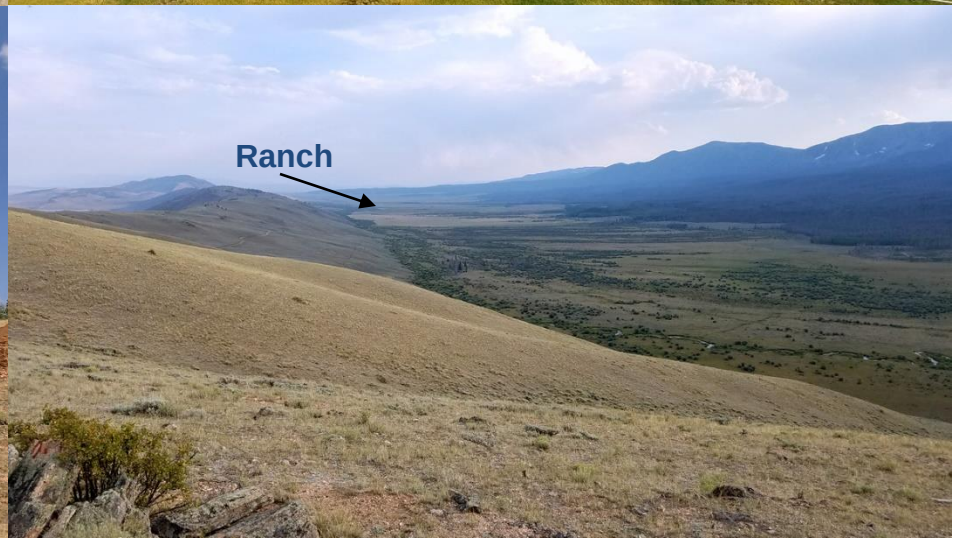


Example of RPT-9000 Repeater used to extend cellular coverage along valley

- Donor antenna at 5m above ground captures cell signal from tower 28 Km away
- Solar Panel & Battery array providing 24 VDC @ 50W to power repeater
- No tower erected on top of hill; horizontal separation between antennas
- Use of 7/8” Heliax cable installed in 2.5” PVC pipe for protection
- Area Fill antenna at 4m height facing south, ranch coverage shaded area in blue

Case Study – Single Repeater Link

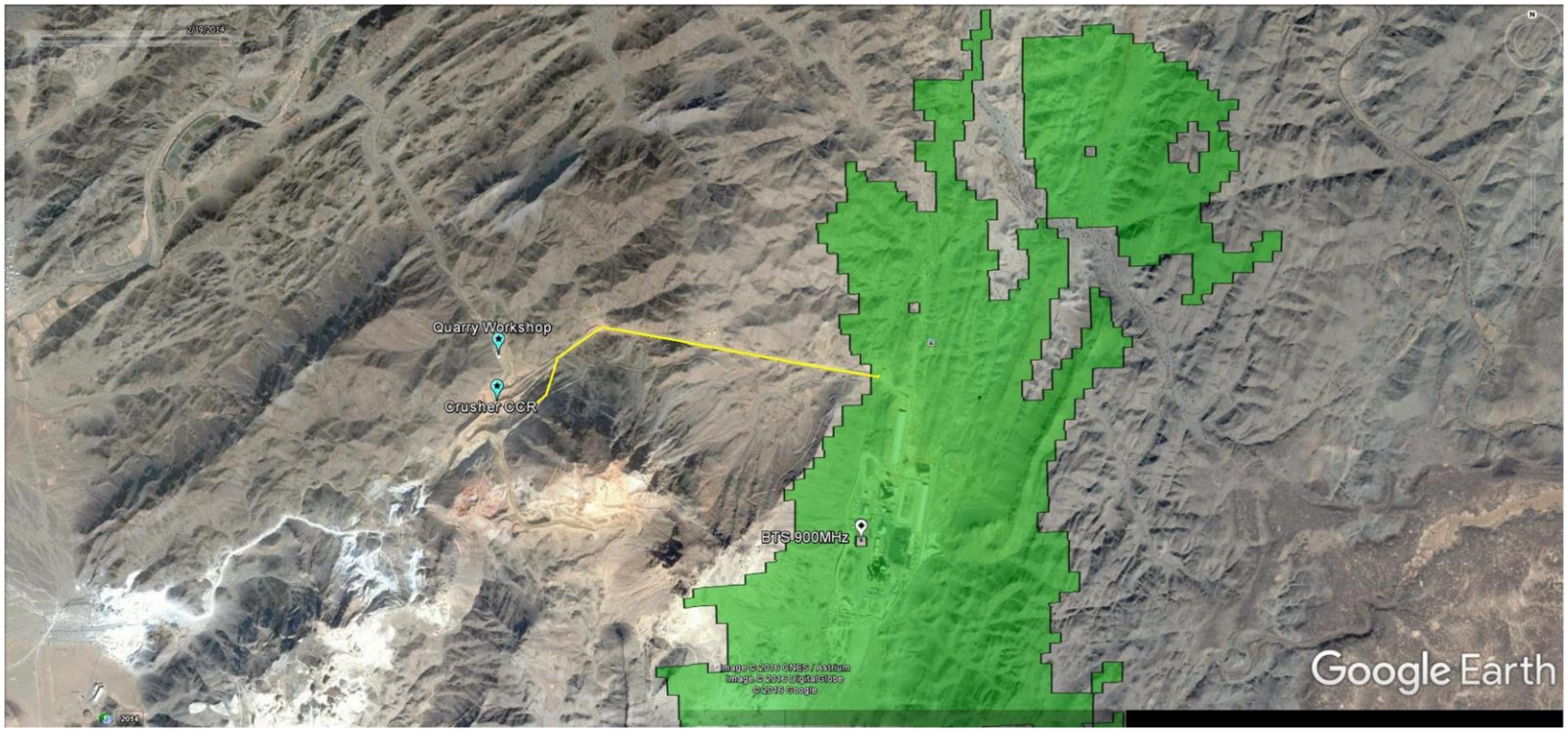




Case Study – Hybrid Repeater Link

- Middle East Cement Plant with close proximity to cell tower
- No coverage along 4 Km road or on other side of large hill
- GSM 900 signal available at start of road
- Use of Master/Slave Hybrid Fibre Repeater to extend signal to far side of hill near Crusher and Quarry Workshop buildings
- Additional Repeater used for signal along road

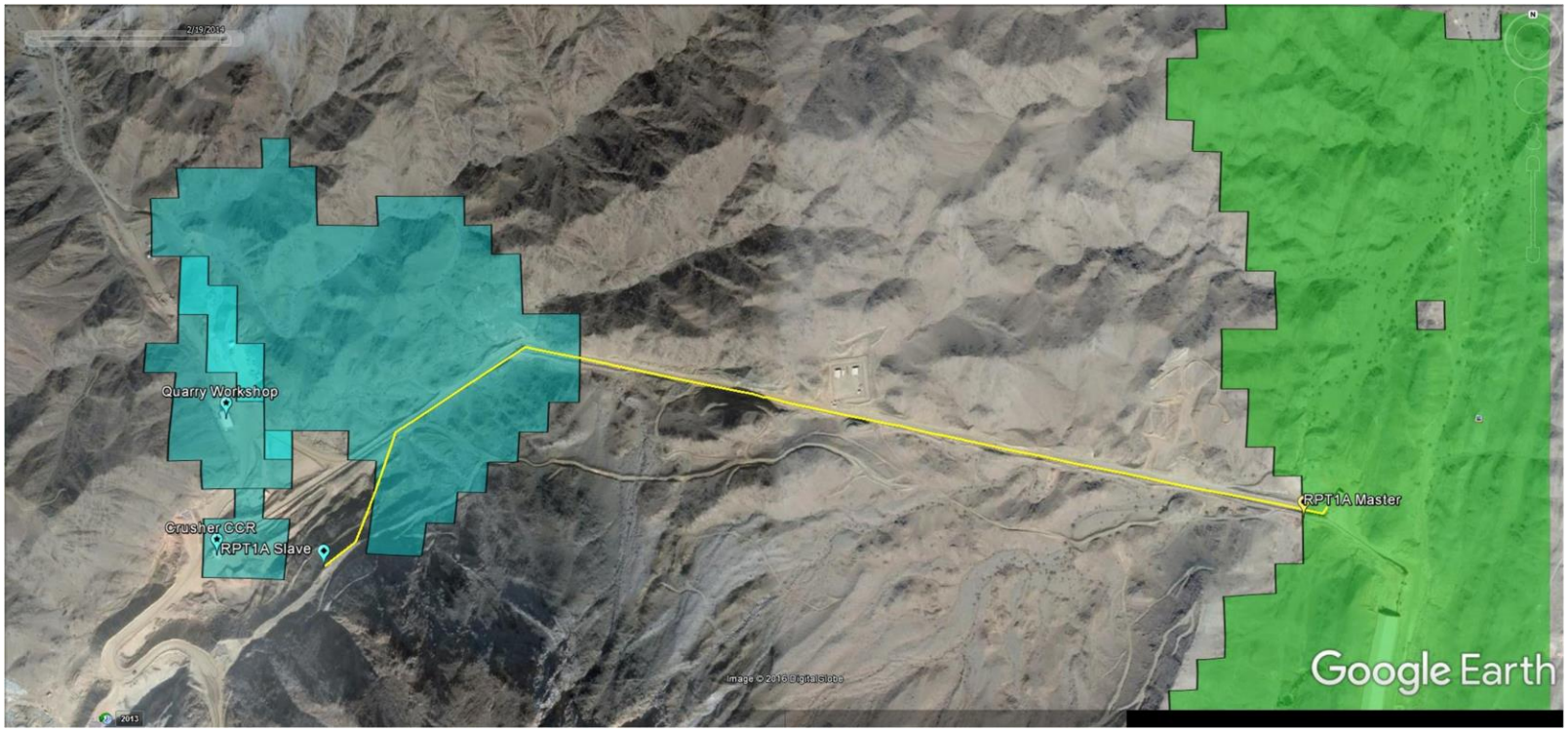
Case Study – Hybrid Repeater Link



Example of GSM 900 BTS at Main Cement Plant location

- Current coverage from 30m tower at a distance of 4 Km shown in green
- Ridge prohibits cell signal from reaching Crusher and Quarry buildings shown in blue
- No coverage along road shown in yellow including Trailers and Explosive Stores area
- Single-mode fibre being run alongside road to extend data network

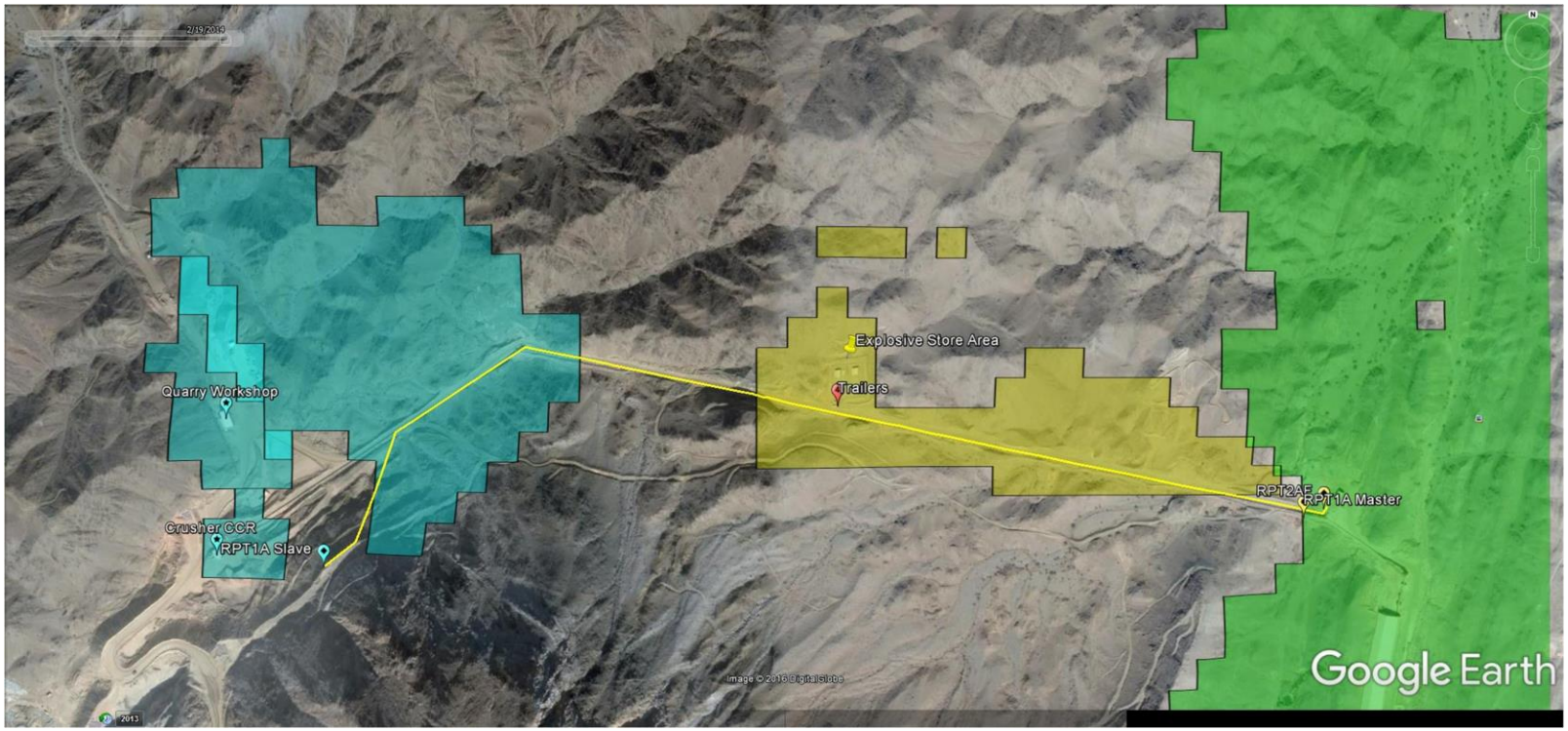
Case Study – Hybrid Repeater Link



Example of Master/Slave Fibre Hybrid Repeater used to extend cellular coverage

- Master unit at start of road connected to a single strand of single-mode fibre
- Slave unit at end of road on 12m tower with antennas covering rear areas
- Crusher and Quarry buildings coverage from far left to straight ahead shown in blue
- Back side of service road off to the right and around the corner also shown in blue

Case Study – Hybrid Repeater Link



Additional RF Repeater used to extend cellular coverage along road

- RPT2 unit installed on top of powerhouse building at start of road
- Used 5 dBi low gain yagi antenna for donor signal from BTS
- Coverage from 33° area fill panel antenna shown in yellow
- Cell signal now covers the road up the hill, trailers and explosive store area

Case Study – Hybrid Repeater Link

Case Study – Single Repeater Link

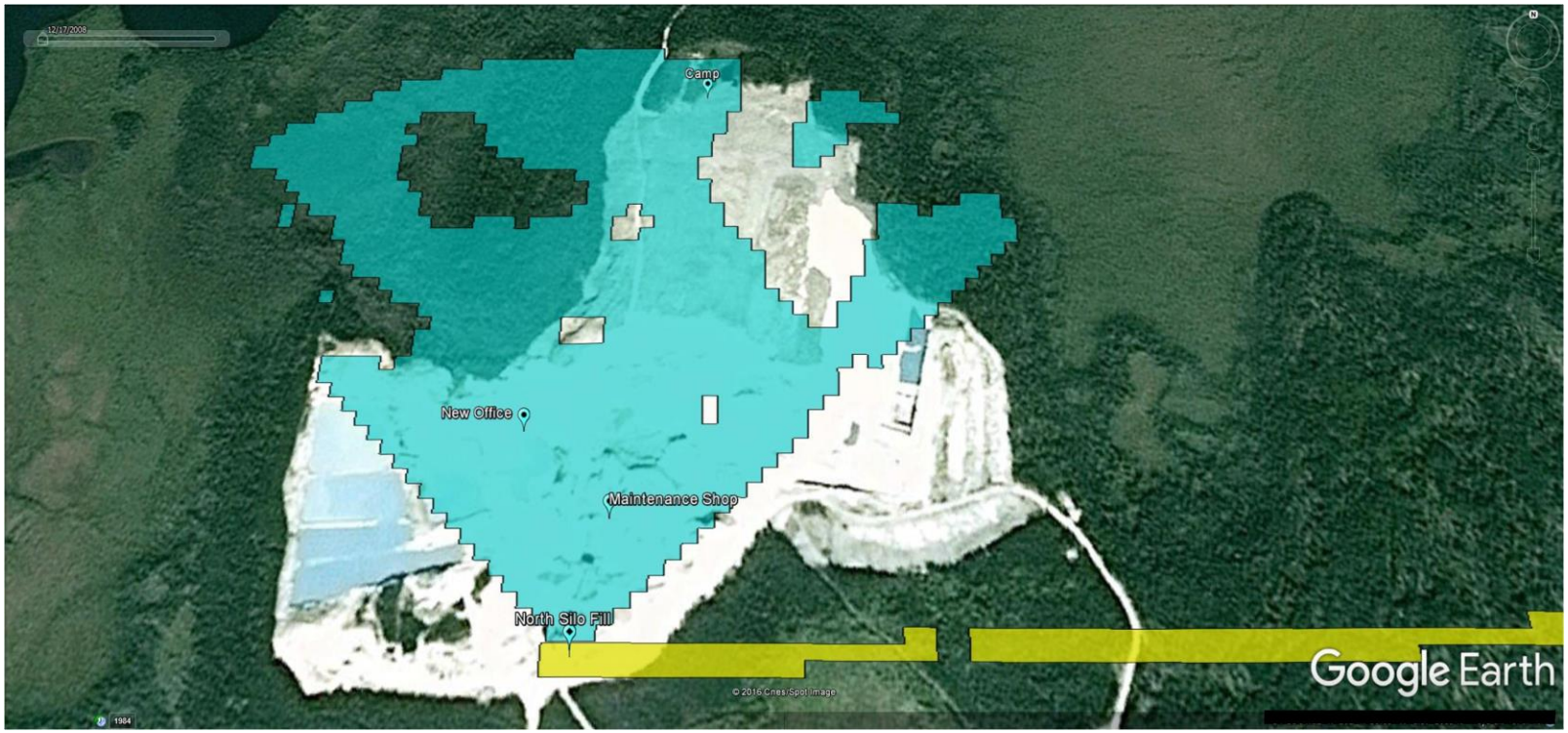
- Western Canada Sand Mining Plant 47 Km from nearest cell tower
- Remote area - no coverage at ground level
- Need for cell service to facilitate better communications in Office Trailers, Maintenance Shop and common areas
- Company mandate to improve morale so workers are able to stay in touch with their families during off hours.

Case Study – Single Repeater Link

Example of Single Repeater Link providing coverage to Office Trailers and Camp

- 850 MHz Cell Tower is located 47 Km to the east of the Mining site
- No cell coverage at ground level due to tree coverage and hills in between
- Line of site on top of silos at 30m above ground level

Case Study – Single Repeater Link



Example of RPT-9000 Repeater used to extend cellular coverage

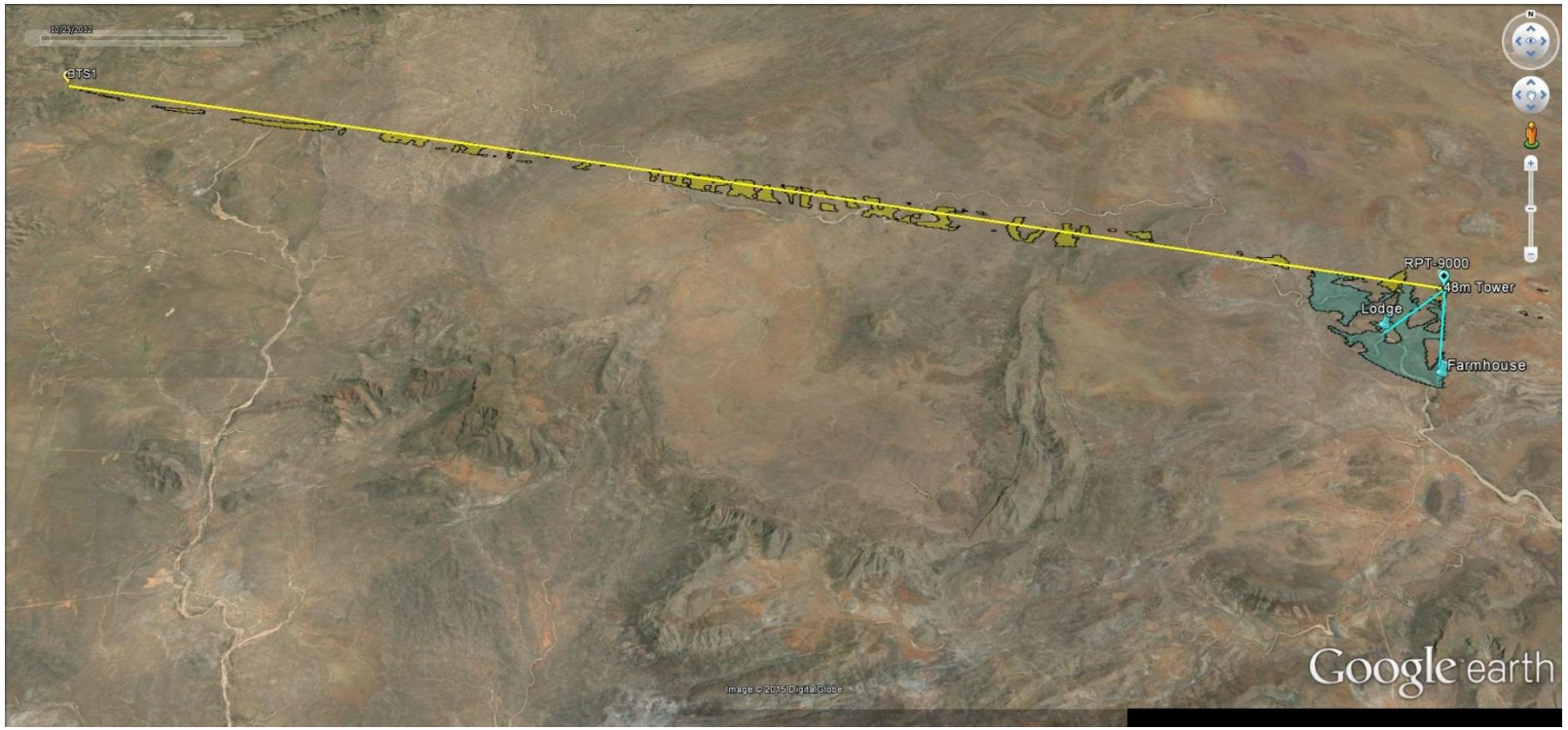
- Donor antenna at 30m above ground captures cell signal from BTS Tower
- Repeater installed at mid point between both antennas, use of 7/8” Heliax cables
- Area Fill antenna at 15m height facing north, shaded area in blue
- Office Trailers, Maintenance Shop and Camp locations have coverage at ground level

Case Study – Single Repeater Link

Case Study – Single Repeater Link

- Western Africa Game Reserve over 50 Km from nearest cell tower
- No coverage at Farmhouse and Lodge due to being in a valley with no Line of Site
- Standard High Speed Internet not available
- Satellite Internet option slow and costly
- GSM 900 and 1800 signal available on hill
- Extended LTE signal to provide voice and data

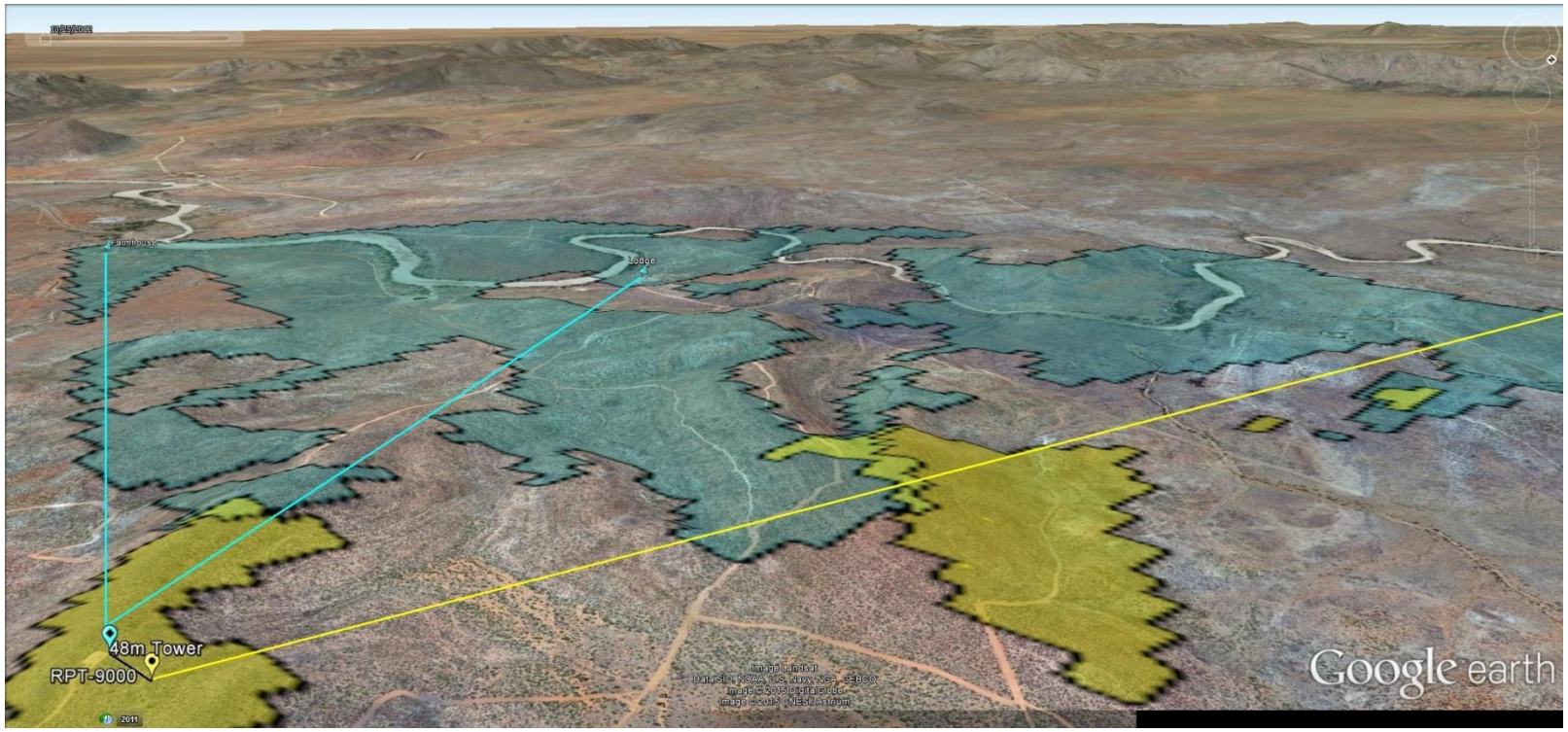
Case Study – Single Repeater Link



Example of 56 km Single Repeater Link proving coverage to Lodge and Farmhouse

- BTS Tower at upper left at 50m above ground level
- Yellow shaded area provides signal coverage toward RPT tower
- Donor antenna at 10m above ground level

Case Study – Single Repeater Link



Example of Single Repeater Link providing coverage to Lodge and Farmhouse

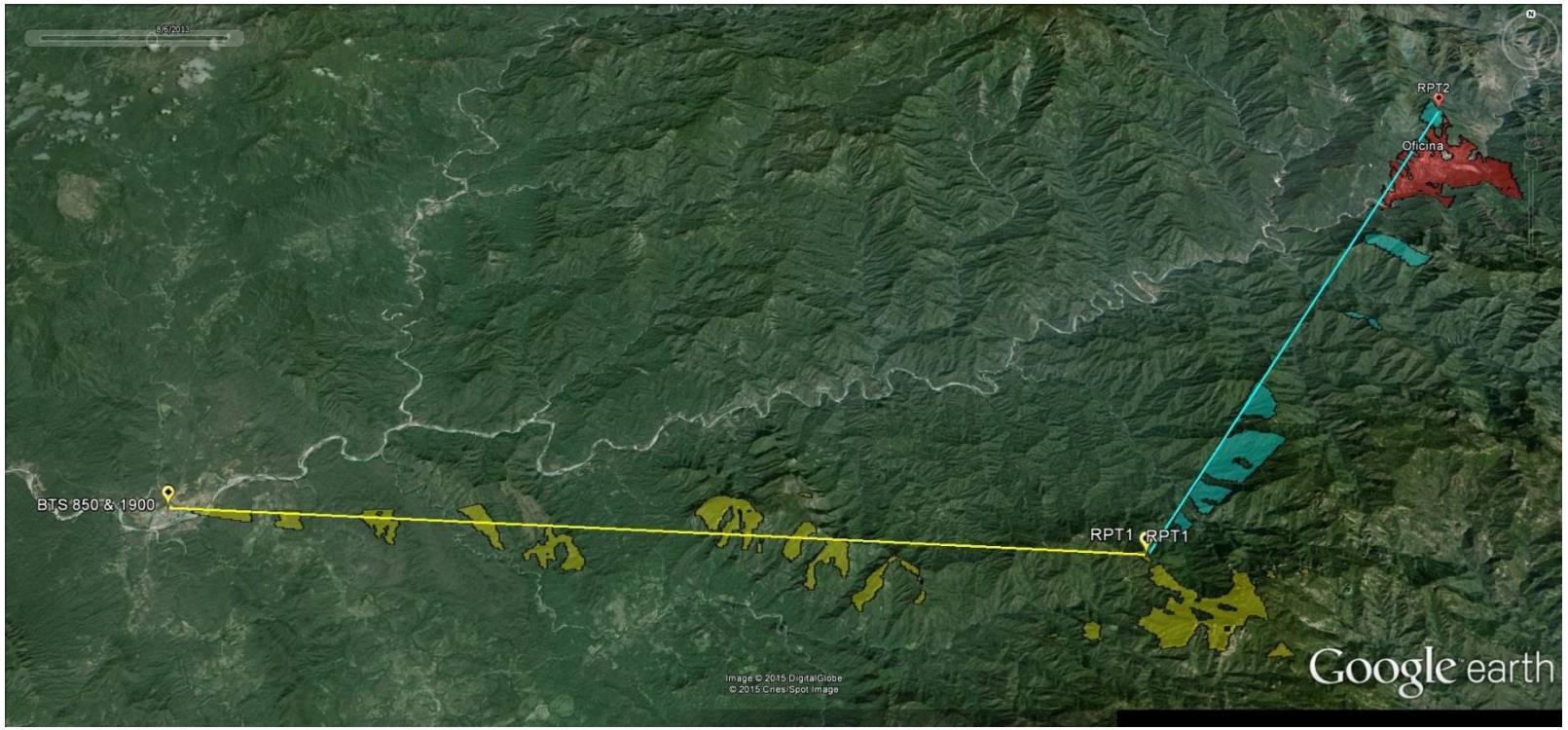
- RPT Tower at bottom left has line of site to Farmhouse and Lodge
- Blue shaded area provides signal coverage to 5 Km area
- Area fill antenna is at 48m above ground level

Case Study – Single Repeater Link

Case Study – Dual Repeater Link

- Central Mexico mining operation over 60 Km from nearest cell tower
- No coverage at main office and ATMs due to being in a valley with no Line of Site
- Critical to have ATM connectivity for cash withdrawal in order to avoid work stoppage
- 850 and 1900 MHz signal available on hill
- Both frequencies extended for redundancy

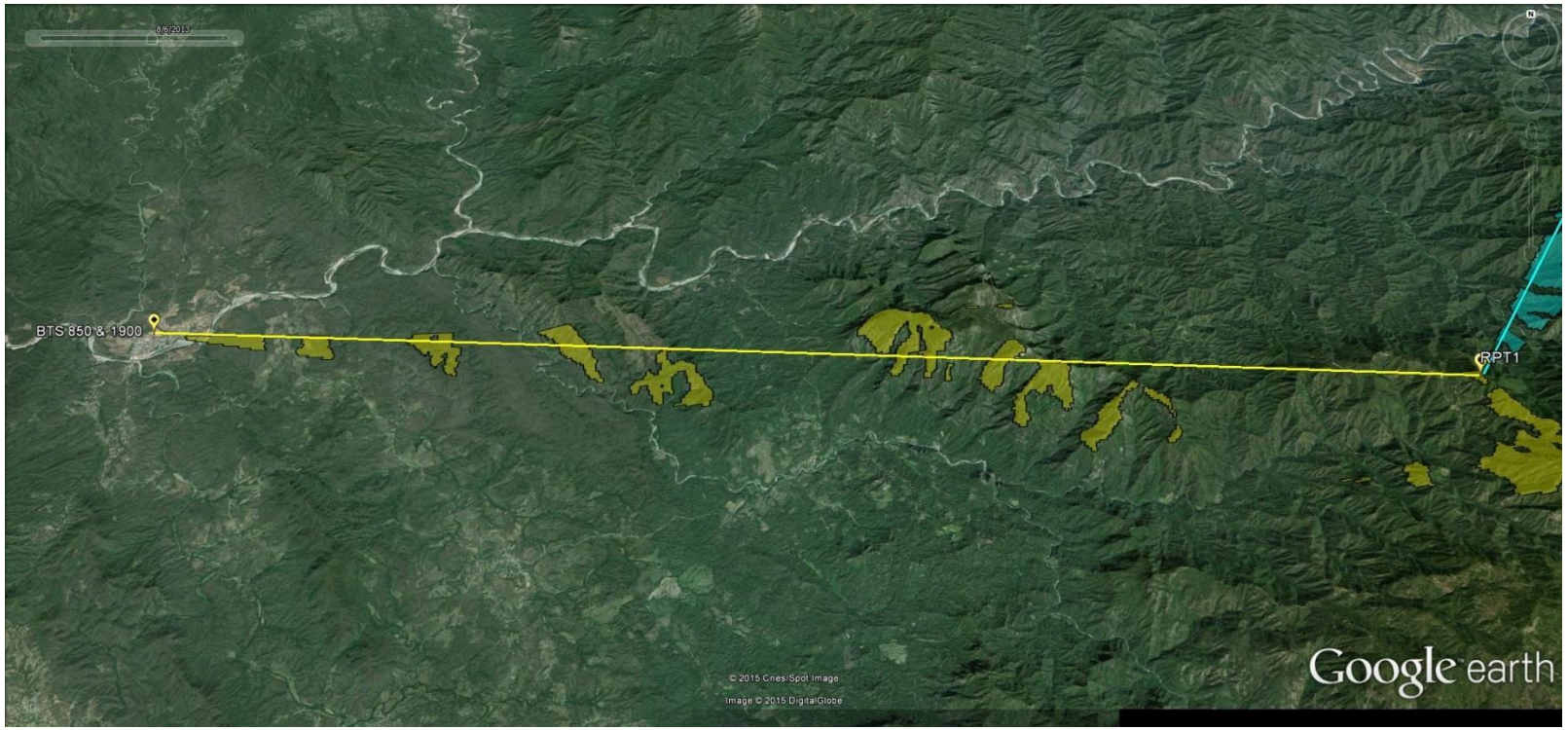
Case Study – Dual Repeater Link



Example of 65 Km Dual Repeater Link proving coverage to main office and ATMs

- BTS yellow shaded area provides signal coverage toward RPT1
- RPT1 blue shaded area provides signal coverage toward RPT2
- RPT2 red shaded area provides signal coverage into valley

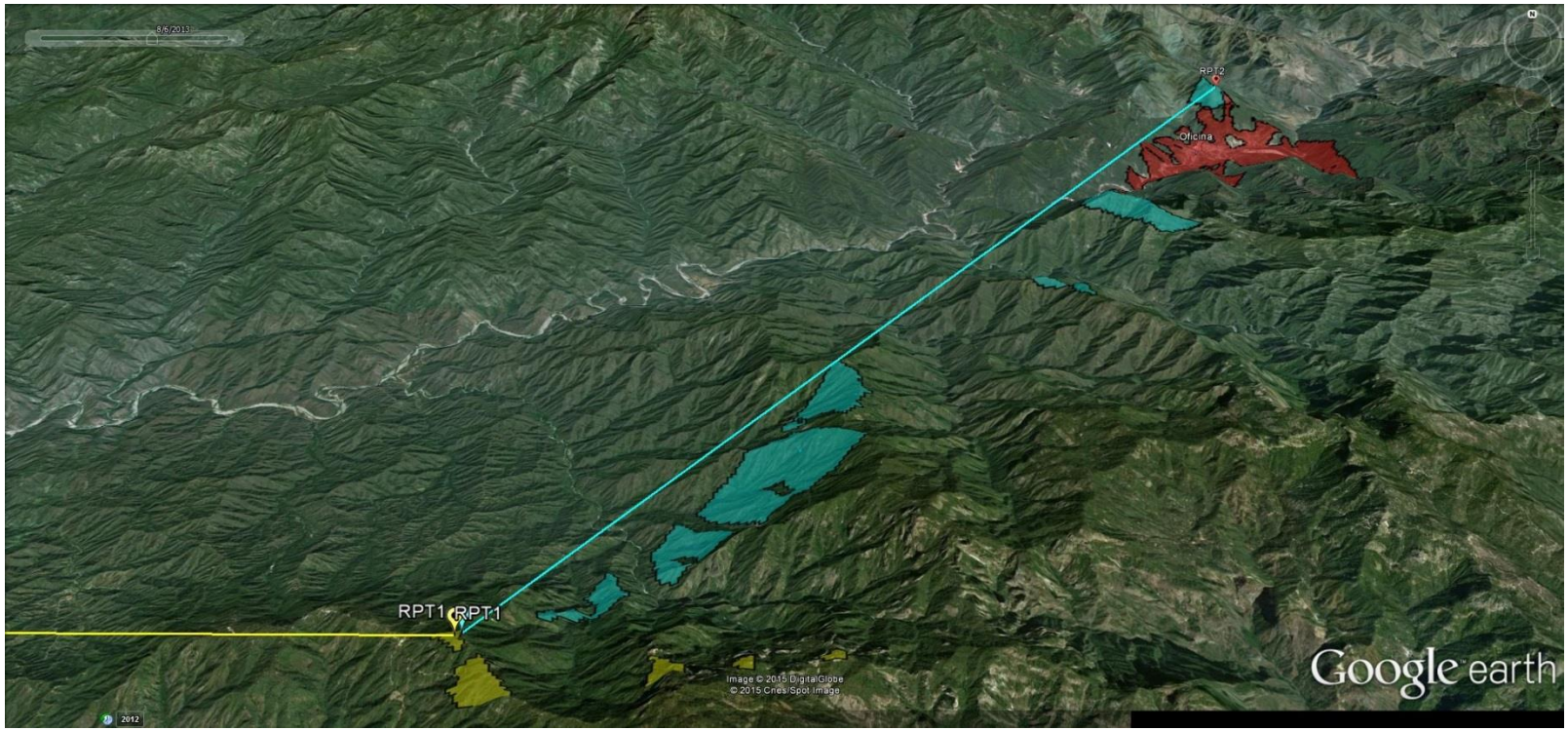
Case Study – Dual Repeater Link



Example of first Repeater Link proving coverage to RPT1 location

- BTS Tower at left is 52m above ground level
- Yellow shaded area provides signal toward RPT1 location at 35 Km
- Donor antenna at 10m above ground level

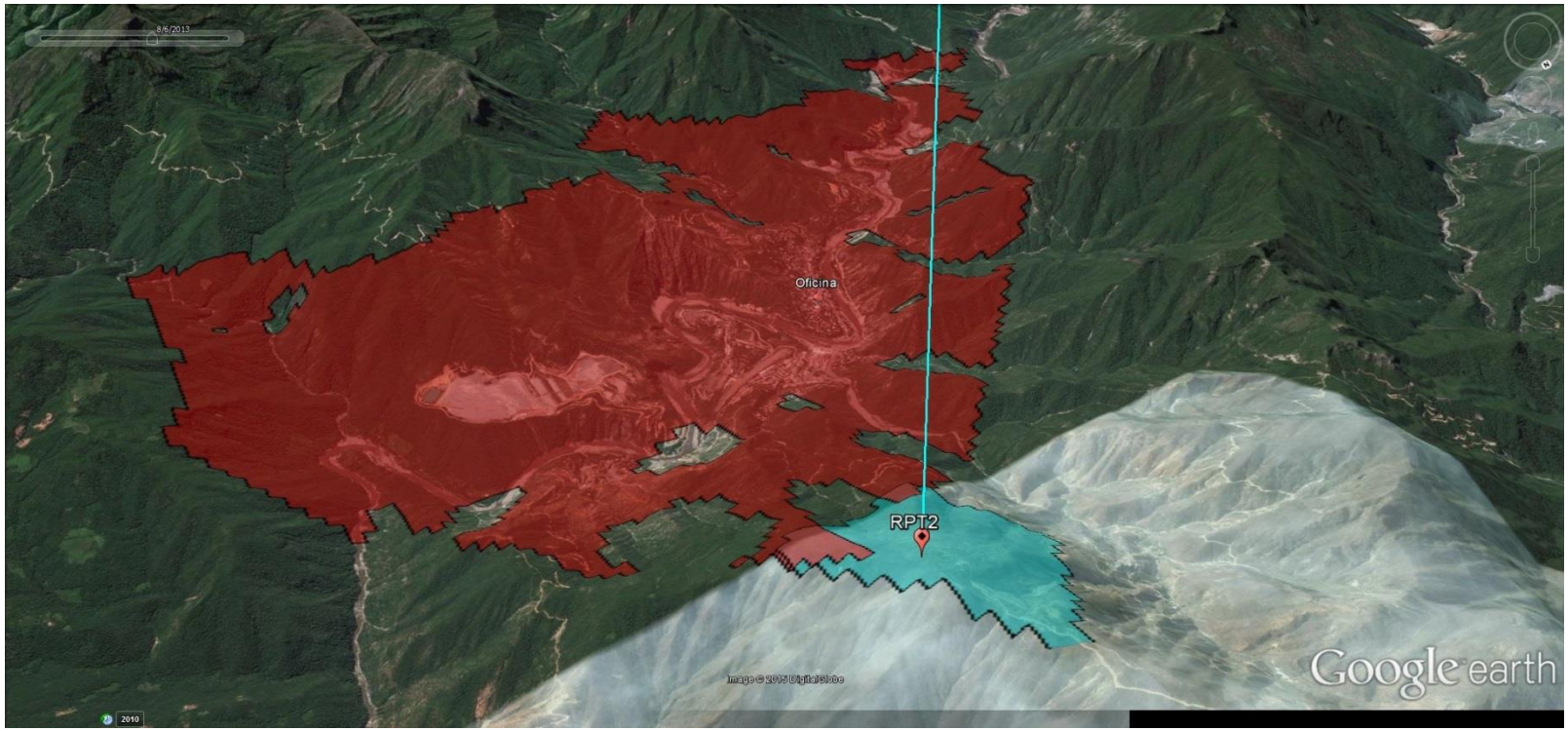
Case Study – Dual Repeater Link



Example of second Repeater Link proving coverage to RPT2 location

- RPT1 at lower left has line of site to RPT2 location
- Blue shaded area provides signal toward RPT2 at 30 Km
- Area fill antenna is at 10m above ground level

Case Study – Dual Repeater Link



Example of second repeater proving coverage down into valley

- RPT2 Tower has line of site to office, ATMs and surrounding area
- Red shaded area provides signal coverage to 6 Km
- Area fill antenna is at 60m above ground level

What we do

Thank you for your interest in XPANDAcell.

We help people who need cell service in underserved areas.

Please contact us today so that we may assist with the design and implementation of your cell coverage project.

Gary Glasgall
Regional Director

XPANDAcell

50 E. Palisade Avenue
Suite 410
Englewood, NJ 07631

Office: +1 201-227-8969
Mobile: +1 551-486-5877
WhatsApp: +1 551-486-5877
Fax: +1 201-227-8965
Skype: gglasgall
Email: gglasgall@xpandacell.com
gglasgall@pulsesupply.com