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GEOLOGIA & MEDIO AMBIENTE

Ballast Rock Sources Location

Montevideo - Paso de los Toros Railroad Track

MINISTERIO DE TRANSPORTE Y OBRAS PÚBLICAS

Available Quarries and Rock Qualities

Noviembre del 2016

Ballast Rock Sources Location

Montevideo – Paso de los Toros Railroad Track

Introduction

This report compiles the available information about the ballast rock sources (quarries) for the Montevideo – Paso de los Toros railroad track. It has been defined a 80km buffer both sides of the track and each open quarry was mapped, classifying them according to the legal framework that allows to operate (see Map #1, #2 and #3).

There are two legal and administrative alternatives for rock exploitation in Uruguay: 1) according to the "Mining Law" (Law #15.242) managed by the *Dirección Nacional de Minería y Geología – DINAMIGE* (the National Directorate of Mining and Geology); and 2) according to the inventory of public works quarries manages by the *Ministerio de Transporte y Obras Públicas – MTOP* (Ministry of Transport and Public Works).

There are several issues about the legal framework, operative, and primarily the destination of the quarry products for each alternative. The DINAMIGE's mining permits are granted to any person (individual or legal entity) local or foreigner who demonstrate its financial capacity to develop the mining project, describe and quantifies the rock to be mined, and obtains the environmental permits. Any requirement for the mining permission is listed in the 100th article of the "Mining Law". This kind of product (crushed stone) is classified as "Class III" underground materials that need to be transformed before used. All products pay taxes (5 to 10% of its commercial value).

The usual deadlines for DINAMIGE's permits are 12 to 18 months. Any open quarry in the buffer area has gone through a long period of paperwork until their permits were granted. Also, each one has the required environmental permits (previous environmental authorization and operation environmental authorization).

The MTOP's quarries are not conditioned by the Mining Law. This permits are granted with the sole purpose of supplying materials to state constructions (mainly roads) for a construction company that applies for a specific tender. That company must process the environmental permits and define an operation & closure plan for the quarry. Usual deadlines for MTOP's quarries are 2 to 8 months.

Strategic Issues

For the railroad supplying of ballast in the Montevideo – Paso de los Toros track, could be 4 strategies:

1) Buy the specific needed rock (30-50mm in size) with the best properties from commercial open quarries;
2) Try to rent a commercial open quarry and produce the required materiales;
3) Apply for a new DINAMIGE's mining permit (or the required mining permits) along the railroad track;
4) Use existing quarries in the MTOP's inventory. Must process the change in destination and corresponding new environmental permits.

Strategies 1 to 4 implies that geological, geotechnical and engineer test were conducted and the rock deposit, its mineralogy and texture, reserves, and engineering properties satisfies the project requirements.

Each strategy has benefits and setbacks:

1) Buy the product: the benefit is the possibility of having ballast that meets all the project requirements without being involved in the production. Obvious trouble is price.

2) Rent a quarry for self-production: the company could control the production rates and take a close look at the quality of the product. Price for ballast should be lower than strategy #1. Main problems are: the rental

must be approved by DINAMIGE (bureaucracy delays), the leasing company must obtain new environmental permits. The company must be involved in quarry – crushing rock operative.

3) Apply for new DINAMIGE's permit/permits: full control of the process, lower costs. The main problem is time (mining and environmental permits require 12 to 18 months for each quarry until operative);

4) Using MTOP's quarries: ballast don't pay extraction taxes, final cost is blasting + crushing + transport to the railroad. Change of target of the quarry product could be 6 to 8 months and needs to obtain new environmental permits.

Commercial Quarries

Each commercial quarry has an DINAMIGE's identifier and a specific area for mining development (a parcel, a portion of a parcel or several ones). The listed quarries have crushed stone as authorized commercial product and could sell the required particle size for the project. Some of the quarries do not meet some of the engineering specifications or do not have the asked essays.

DINAMIGE As. 48/1984

This quarry is located in Canelones, at the east of Montevideo at 26.1km of paved road (R101, R102) from the +12.4km of the railroad track (at the point where the railroad crosses the 102 Rd). Owner is STILER S.A. and the rock is non-operative but has the mining permits up to date. Environmental permits need revision to increase production rates. Main problem is the proximity of housing.

Flooded 48/1984 quarry.

Muscovite-garnet foliated micro-granite.

Two-micas granitic gneiss (muscovite/biotite) with well-developed foliation.

Pegmatitic dikes cutting granitic-gneisses.

Muscovite-gneiss.

The exploited rock is a very foliated granitic gneiss with high lateral variations in nature (texture, rock type). Crushed stone were produced here for road construction (asphalt mix, cement mix). Old Los Angeles data is 32.3% and reserves are higher than 200.000m^3 of bulk rock.

DINAMIGE As. 3511/2013

The quarry is located in Canelones, at the South of Soca's town at 61km from the point where the railroad crosses the 102 Rd (R8, R101, R102) at +12.4km in the railroad track. Owner is URALCOR S.A. and the quarry is operative (in the first stage of development). The installed production rate is 100 ton/hour of crushed stone of several sizes.

Uralcor SA has mining and environmental permits up to date. Contact is Mr. Flavio García Repetto (cell phone: 099.840.080).

Provided essays are:

- Density (bulk): 2.691 g/cm^3
- Micro Deval (humid, 14mm): 9.8
- Los Angeles ("B" grad.): 28.3%
- Magnesium sulphate durability: 1.7%

Kind of rock exploited for Uralcor SA at 3511/2013 permit.

It is a gray granite with pertitic-microcline mega-crystals, with quarz and oligoclase in the matrix. Accessory minerals are pyroxene, poikilitic amphibole, biotite, apatite and zircon.

Soca granite sample.

DINAMIGE As .1316/2011

Quarry ("Cantera San José") located North of San José city at 6.5km (unpavemented road) and 38.4km (pavemented road) from +63.6km of the railroad track in the 25 de Agosto town (R11). Owner is Mr. William Porley (phone 4340.2405, williamporley@adinet.com.uy). He said the quarry is operative and have the mining and environmental permits up to date.

Essays:

- Simple compression (5 samples): 650.1 kg/cm^2, 614.9 kg/cm^2, 648.9 kg/cm^2, 655.8 kg/cm^2, 713.0 kg/cm^2
- Los Angeles ("B" grad.): 23.0%
- Relative density: 2.561 g/cm^3
- Absortion: 0.64%

DINAMIGE As. 1240/2006

This quarry is located far away from the 80km buffer. It is 175.5km North of Paso de los Toros but it is included here because it has a very low Los Angeles coefficient for basaltic crushed stone (12%). The commercial name is "Altos del Sur S.A." quarry and has straight access from 5th Rd and the possibility of railroad transport of ballast. Permits – mining and environmental – are up to date. It has 200 m^3/day of 30-50mm production rate already installed and was supplying material for the railroad near Tacuarembó.

One of two crushers in this quarry.

Quarry front near the top of the hill.

Fresh massive-basaltic sample.

Different sizes of crushed basaltic stone in Altos del Sur S.A. quarry.

DINAMIGE As. 592/1948

Canteras Montevideo S.A. quarry is the biggest one of its kind in Uruguay. It has an installed production of 50.000 ton/month of granitic crushed stone of different sizes. It is located into Montevideo, at 32.7km of the point where the railroad crosses the 102 Rd (Carrasco Rd, R101, R102). Mining and environmental permits are up to date. Reserves are bigger than 1.200.000m^3 of bulk rock.

Rock classification into the quarry.

Discharge of bulk rock in the primary jaw crusher.

Tertiary circuit.

Tertiary circuit.

Tertiary circuit.

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The rock is a biotite-granodiorite of fine to medium grain size mixed with a leucocratic fine-grained granodiorite.

Biotitic granodiorite.

Fine grained leucocratic granodiorite.

DINAMIGE As. 386/1999

This quarry is located in the border between Colonia and San José departments at 75.5km by pavemented road of 25 de Agosto town (R23, R11). The owner is TEBLIX S.A. and has mining and environmental permits up to date. Reserves are bigger than 350.000m^3 bulk rock and the quarry is operative.

Los Angeles essays shows 25% for grad. “B” (14-20mm) and 32% for grad “C” (5-14mm). Rock is a coarse grain granite.

MTOP Quarries

Each described quarry has an identifier provided by the Ministery (MTOP). Not all of them were visited, nor have essays data.

MTOP S-009

Located in Montevideo, near Canteras Montevideo S.A. at 32.7km of the +12.4km railroad track (102 Rd and railroad). The quarry exploits the same rock as Canteras Montevideo SA (fine grained granodiorite) but it is at the end of its resources, maybe there are less than 10.000m^3 of bulk rock.

MTOP S-005

Quarry located in Montevideo, near the border with Canelones at the West of the railroad at 12.4km of 102 Rd and railroad. There are no data about crushed stone production but its listed as a product. In this place the rock is a reddish biotite granite of medium grain size. No other data provided.

MTOP S-004

Located near MTOP S-005 at near 6km of the 102 Rd and railroad. Same rock, no information about production.

MTOP R-017

Located near the 5th road in Tacuarembó, at 11.4km by pavement road (R5) from the end point of the railroad track. It is an old quarry without fresh rock front unless it has crushed stone as a product.

MTOP R-017 quarry looking at north. At left: road N° 5.

MTOP R-013

Old quarry near 5th Rd at 68.5km North of the end of railroad track. Decomposed basaltic rock. No data available.

MTOP R-012

Quarry located near 5th Rd at 29.5km North of the end of railroad track. No data available.

MTOP Q-008

Old quarry of basaltic ballast near the railroad track in the North of Durazno, near the border with Tacuarembó and Paso de los Toros city. The quarry was used for ballast, has old discharge hoppers with railroad deviation. The quarry is nearly exhausted, very close to the limits of the permit. Could be possible to expand the limits and use the same basaltic rock in the surroundings or maybe explore the quality of the rock below the current floor. In this case, reserves could be more than 150.000m^3 of bulk rock.

Quarry MTOP Q-008, discharge hoppers, railroad and Paso de los Toros city.

MTOP Q-007

Granitic rock quarry with more than 350.000m³ of bulk rock reserves. Located near route N°5 at 1.2km at the East of the +199.4km of the railroad track. Los Angeles essay is 26.1%.

MTOP Q-007. Granitic rock quarry near 5th Rd.

MTOP O-008

Quarry located in the Florida department, 11.7km to the East of the +111.9km of the railroad track. The permit has big reserves of a gray granodiorite of medium size grain with biotite and amphibole. Fresh rock. No other data.

MTOP N-014

Quarry located to the North of road N° 14 in Flores department at 34.6km to the West of the +206.5km of the railroad track. No available data.

MTOP N-001

Big quarry located near route N° 3 in Flores, at 52.4km of +206.5km of the railroad track. It was used for construction and reparation of pavement of several routes. Grayish biotite-granite of medium size grain.

MTOP M-004

Very old quarry at the North-west of San José city. Located at 38.4km of 25 de Agosto town. No data available.

MTOP A-036 & A-010

Two quarries located one next the other in Canelones, at 26.6km to the East of the +12.4km of the railroad track. Both quarries in operation. No data available.

MTOP A-032

Located near DINAMIGE 3511/2013. Same rock, we can assume same essay values. Non-operative.

MTOP A-031

Located near Soca's town in Canelones, at 61.3km at the East of +12.4km of the railroad track. Crushed stone capable rock is the floor of an old coarse arid quarry (base of weathering profile). No data available.

MTOP A-027

Located in Canelones, at 7.6km to the West of +18.4km of the railroad track. The quarry exploited the thick weathering profile of a reddish biotite-granite and now is crushing the unweathering floor. No data about quality.

Summary Table

Code	UTMx	UTMy	Distance to railroad	Railroad progressive	Rock type	Reserves (m3)	Los Angeles
DINAMIGE 48/1984	592410	6150315	27.0km	+12.4km	Granitic gneiss	>200.000	32%
DINAMIGE 3511/2013	625340	6161800	62.5km	+12.4km	Granite	>400.000	28%
DINAMIGE 1316/2011	520730	6206300	44.9km	+63.6km	Granite ± gneiss	±200.000	20-25% *
DINAMIGE 1240/2006	613750	6503740	175.5km	+273.7km	Basalt	>100.000	12%
DINAMIGE 592/1948	583850	6142250	34.5km	+12.4km	Granite (granodiorite)	>1.200.000	12%
DINAMIGE 386/1999	500000	6225500	75.5km	+63.6km	Granite	>350.000	25%
MTOP S-009	583060	6142040	34.5km	+12.4km	Granite (granodiorite)	<10.000	12-15% *
MTOP S-005	566350	6154700	12.4km	+12.4km	Granite	±150.000	20-25% *
MTOP S-004	568930	6153250	5.9km	+12.4km	Granite	±30.000	20-25% *
MTOP R-017	547060	6380720	11.4km	+273.7km	Basalt	±60.000	25-30% *
MTOP R-013	572670	6430440	68.5km	+273.7km	Basalt	<30.000	>25% *
MTOP R-012	555700	6397140	29.5km	+273.7km	Basalt	±36.000	20-25% *
MTOP Q-008	545510	6367415	0.0km	+271.2km	Basalt	±150.000	15-20% *
MTOP Q-007	546960	6301620	1.7km	+199.4km	Granite (gneissic)	>350.000	26%
MTOP O-008	578400	6219600	13.8km	+111.9km	Granodiorite	>500.000	15-20% *
MTOP N-014	514740	6294780	35.1km	+206.5km	Granite	±120.000	20-25% *
MTOP N-001	512960	6281030	52.4km	+206.5km	Granite	>400.000	15-20% *
MTOP M-004	519790	6208240	37.4km	+63.6km	Granite	±50.000	20-25% *
MTOP A-036	591800	6157700	29.4km	+12.4km	Granite	<15.000	20-25% *
MTOP A-032	624770	6161900	62.5km	+12.4km	Granite	±300.000	25-30% *
MTOP A-031	625615	6161950	63.7km	+12.4km	Granite	<70.000	25-30% *
MTOP A-027	566680	6155070	7.5km	+12.4km	Granite	<50.000	20-25% *
MTOP A-010	591600	6157610	29.7km	+12.4km	Granite	±100.000	20-25% *

The asterisk near the "Los Angeles" shows probable values.

Geological Availability of Ballast Rock

It was already submitted the document – in Spanish – about the availability of rocks that could be used as ballast source. In this document the maps are exposed again to show the location of each quarry listed above over the geologic map of Uruguay.

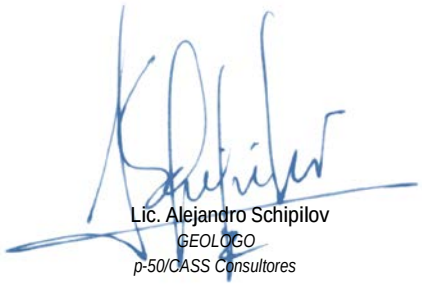
Recommended Rock Sources

Divided the railroad track in 3 or 4 segments, could be the same number of sources for ballast. At the south, rocks like Canteras Montevideo's are the best choice (DINAMIGE 592/1948). Unfortunately, there is no chance to open a new quarry in the area. MTOP S-009 is located a few meters from this one, but it's reserves are very low.

In Florida, the best choice is MTOP O-008. It is a big and deep quarry of a gray fresh granite in a large surrounding permit.

Near Durazno, best choice could be MTOP Q-007. It has high Los Angeles value (26%) but probably in a second level – floor – this value could be reduced.

At the end of the track – near Paso de los Toros – the choice could be MTOP Q-008, adjacent to the railroad and already used for ballast.



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Map #1

SORIANO
FLORES
FLORIDA
COLONIA
SAN JOSÉ
CANELONES
LAVALLEJA
MALDONADO
MONTEVIDEO

Jesús González Ltda
Lecatte
Teblix SA
Calmex SA
H. Vonrotz
Porley
Colier SA
Canteras Montevide SA

Río Rosario
Río San José
Río Santa Lucía Chico
Río Santa Lucía
Río Viejo

Railroad track
80km buffer
Unpaved road
Paved road
Commercial quarry
MTOP quarry
Basaltic rock
Granitic rock
Other granular materials

0 5 000 10 000 15 000 20 000 m

480000 500000 520000 540000 560000 580000 600000 620000 640000 660000

6240000 6220000 6200000 6180000 6160000 6140000

Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

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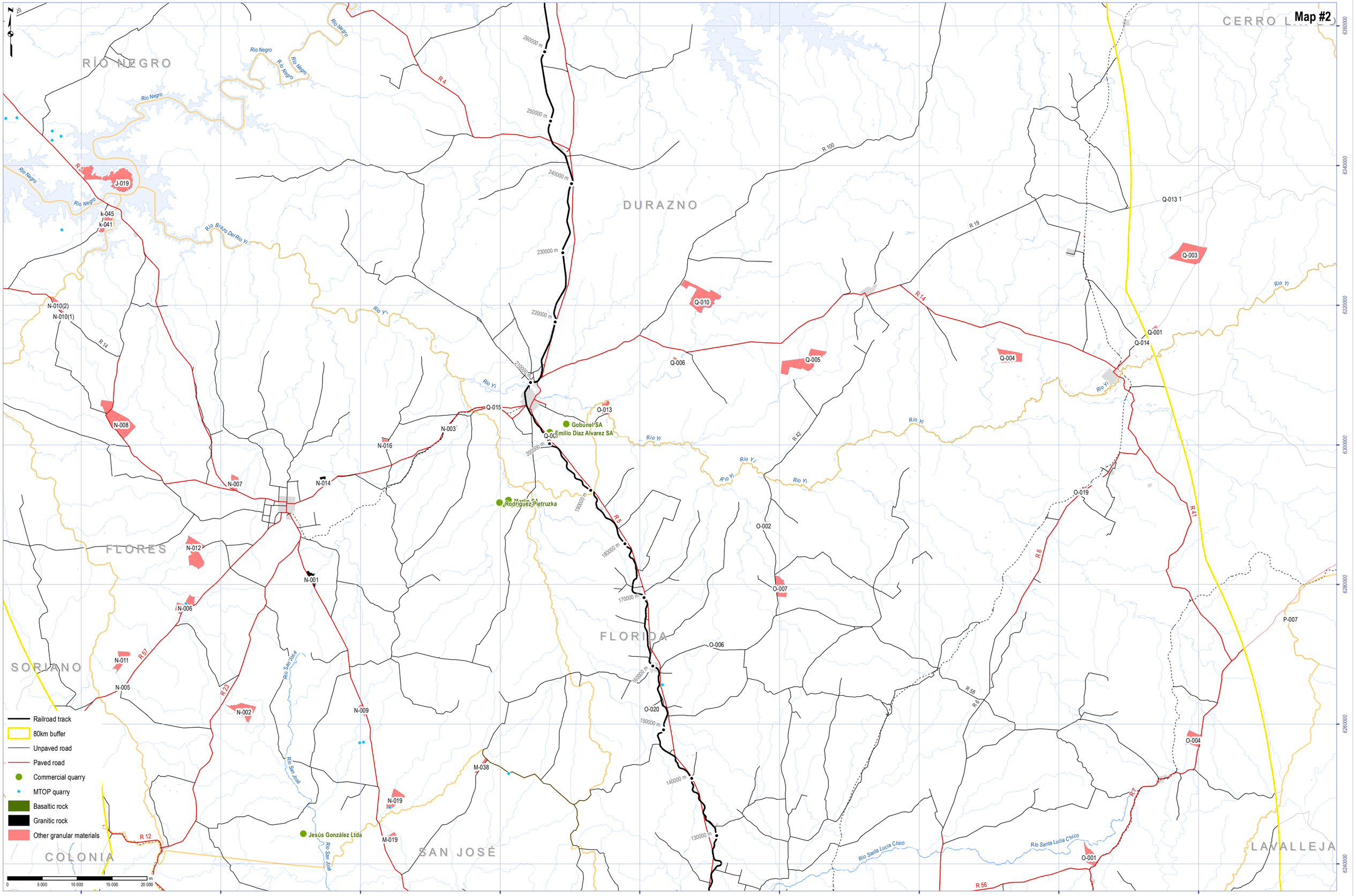
Map #2



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Map #3

PAYSANDÚ

RÍO NEGRO

TACUAREMBÓ

DURAZNO

SORIANO

FLORES

I-019

R-023

R-013

R-012

R-017

R-018

R-004

R-026

J-004

J-013

J-014

J-019

k-045

Q-008

270000 m

260000 m

250000 m

240000 m

Q-013 1

Rio Queguay Chico

Rio Queguay Grande

Rio Tacuarembó

Rio Negro

R 25

R 5

R 43

R 59

R 20

R 4

R 3

R 55

R 42

R 100

R 19

Railroad track

80km buffer

Unpaved road

Paved road

Commercial quarry

MTOP quarry

Basaltic rock

Granitic rock

Other granular materials

0 5 000 10 000 15 000 20 000 m

460000 480000 500000 520000 540000 560000 580000 600000 620000

6460000 6440000 6420000 6400000 6380000 6360000 6340000

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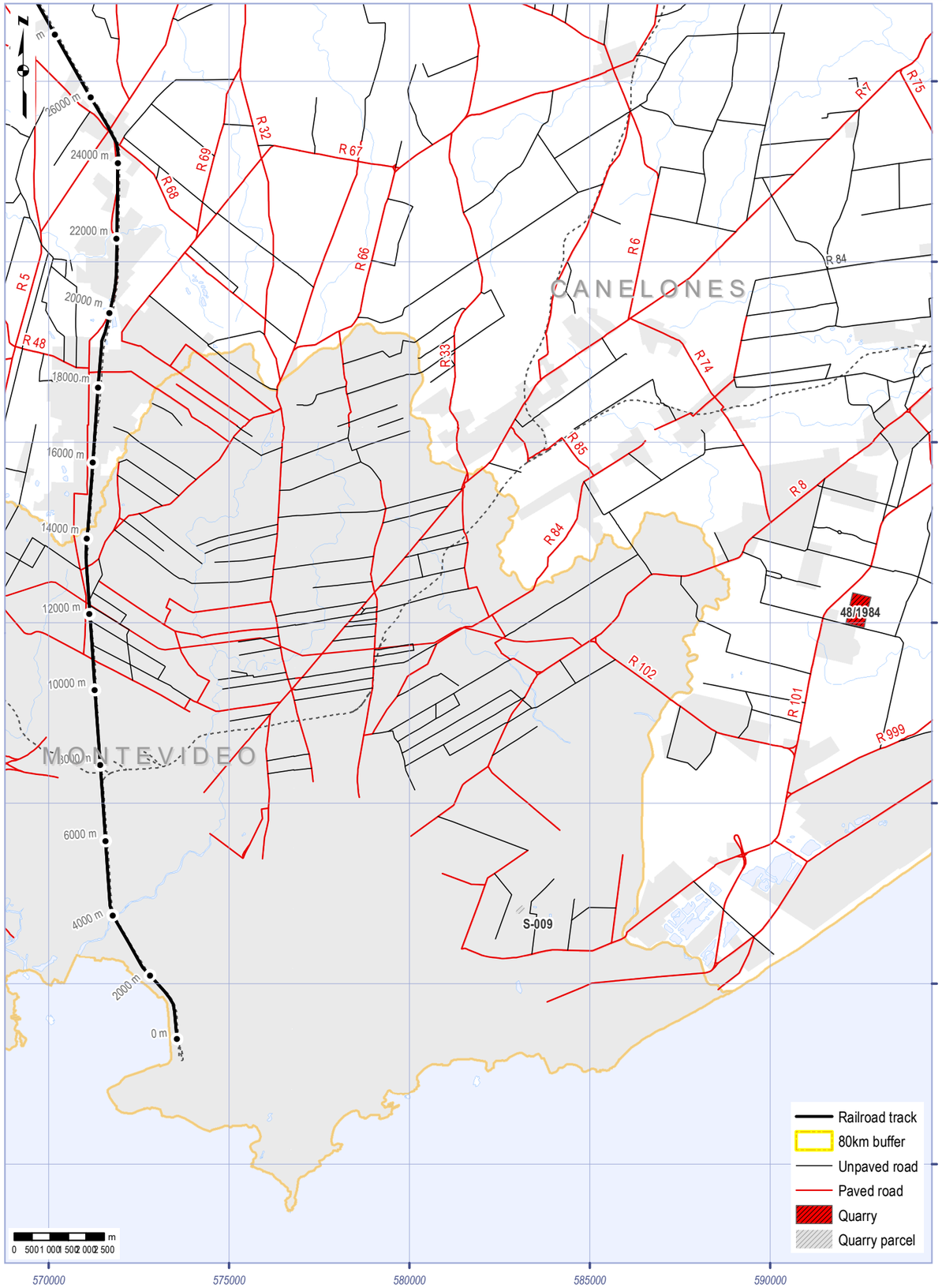

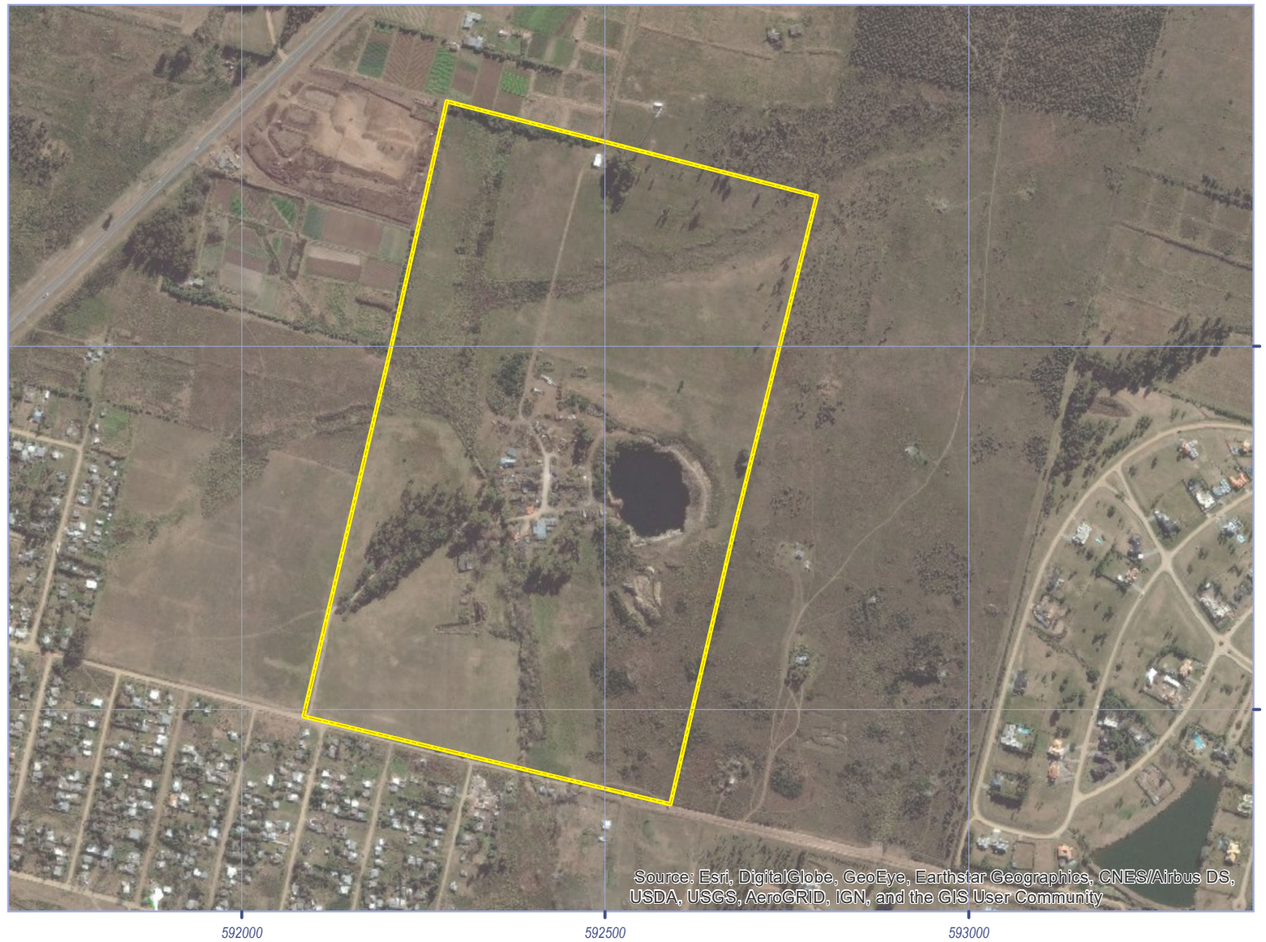

Quarry ID:	**As. 48/1984**	Closer railroad point:	**+12.4km**
Location (UTM):	**592410 - 6150315**	PAV road distance:	**26.1km + UPV**
Location (geographic):	**Road N° 101**	UNPAV road distance:	**0.9km**
Parcel:	**11065 (10) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granitic gneiss**		
Quarry area:	**101.170m2**		
Owner:	**Stiler S.A.**		
Los Angeles test data:	**32.3%**		
Reserves:	**> 200.000m3 bulk rock**		
Permit issues:	**Need to update environmental permits**		

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DINAMIGE As. 48/1984

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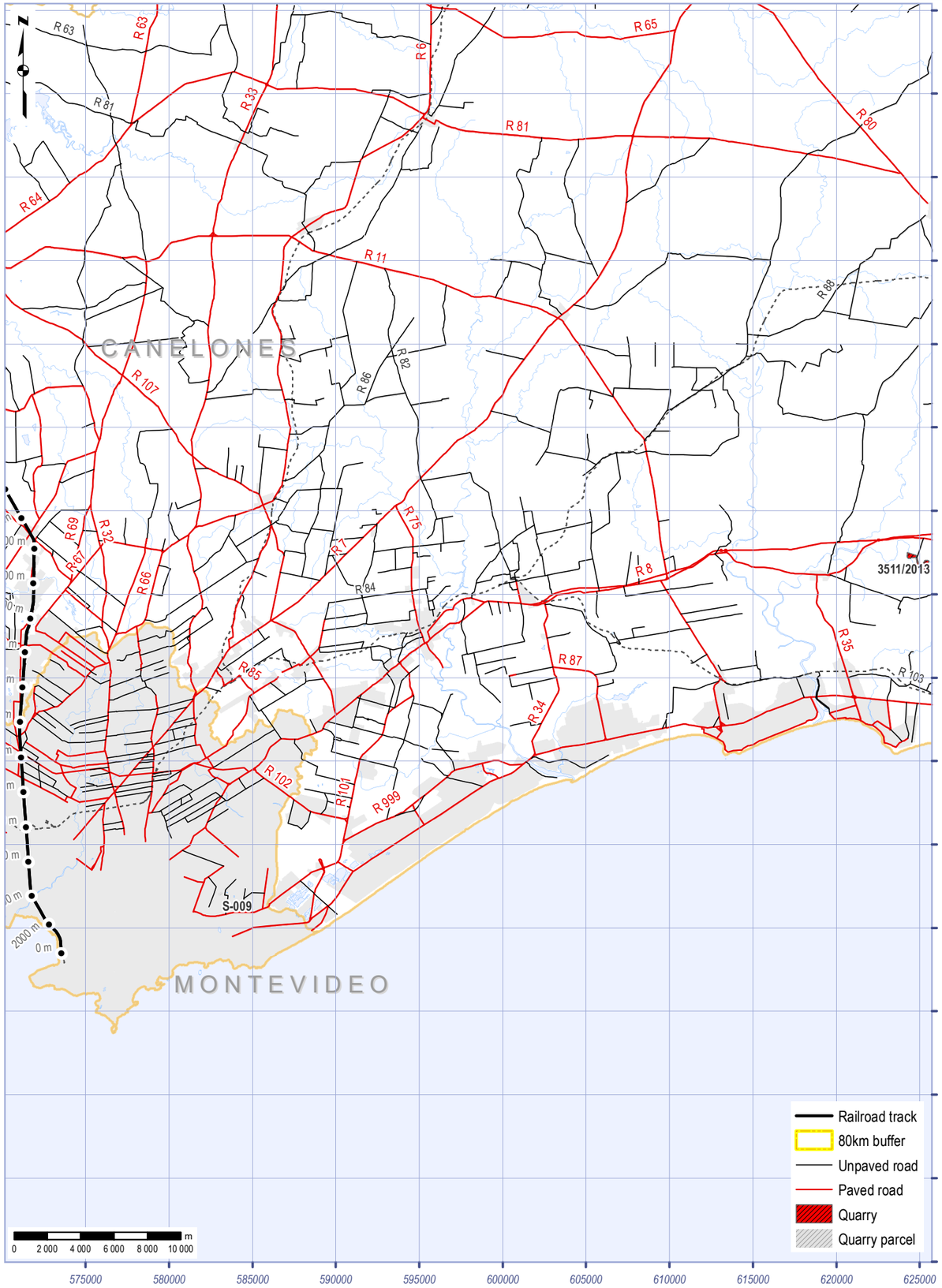

Quarry ID:	**As.3511/2013**	Closer railroad point:	**+12.4km**
Location (UTM):	**625340 - 6161800**	PAV road distance:	**61.0km + UPV**
Location (geographic):	**Soca**	UNPAV road distance:	**1.5km**
Parcel:	**62984, 16855, 39056... (8) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**588.300m2**		
Owner:	**Uralcor S.A.**		
Los Angeles test data:	**28.3% ("B" graduation)**		
Reserves:	**> 400.000m3 bulk rock**		
Permit issues:	**Up to date**		

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DINAMIGE As. 3511/2013

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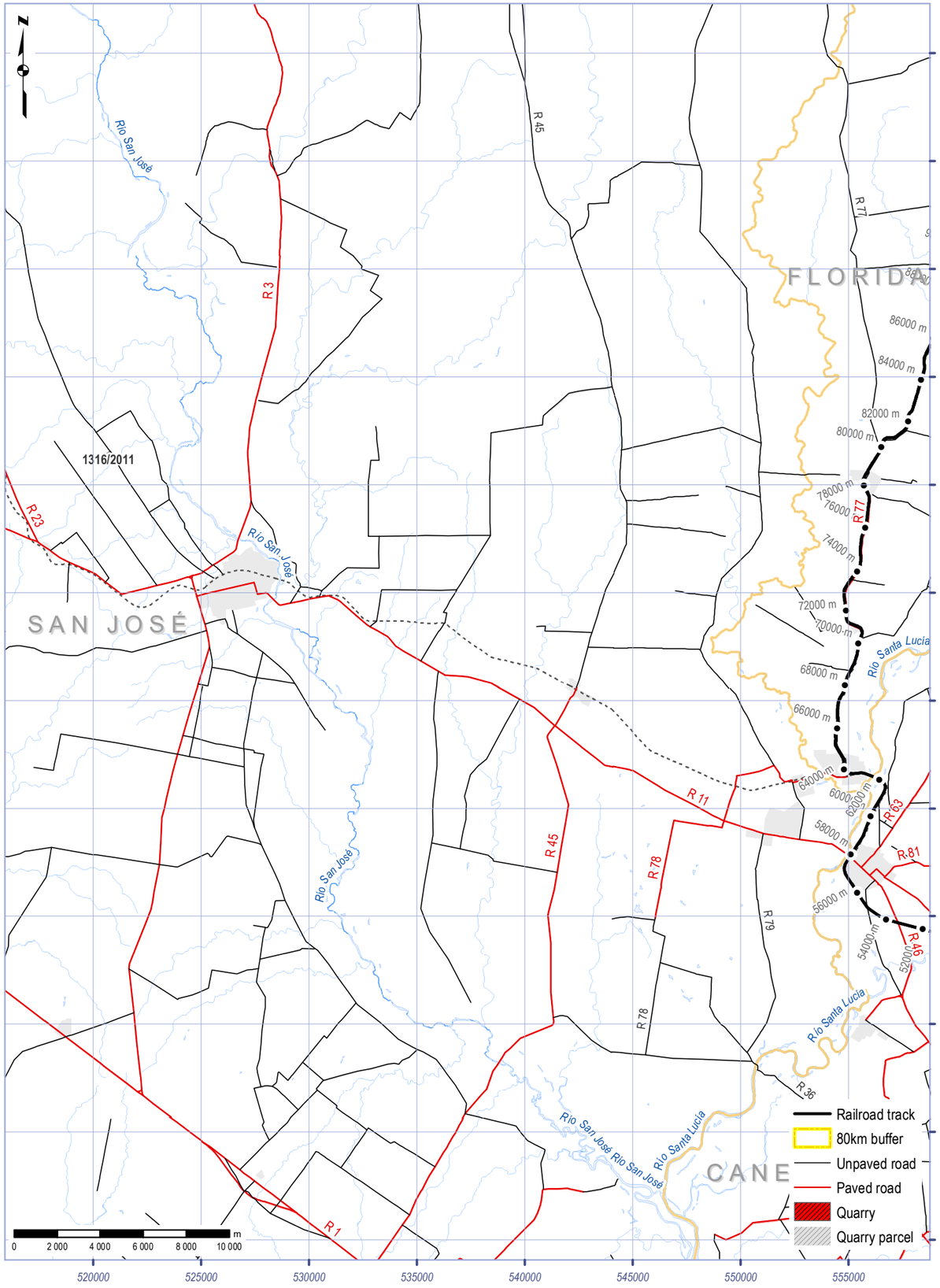

Quarry ID:	**As.1316/2011**	Closer railroad point:	**+63.6km**
Location (UTM):	**520730 - 6206300**	PAV road distance:	**38.4km**
Location (geographic):	**San José**	UNPAV road distance:	**6.5km**
Parcel:	**2936 (7) - San José**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**146.181m2**		
Owner:	**William Porley**		
Los Angeles test data:	**ND**		
Reserves:	**ND**		
Permit issues:	**Up to date**		

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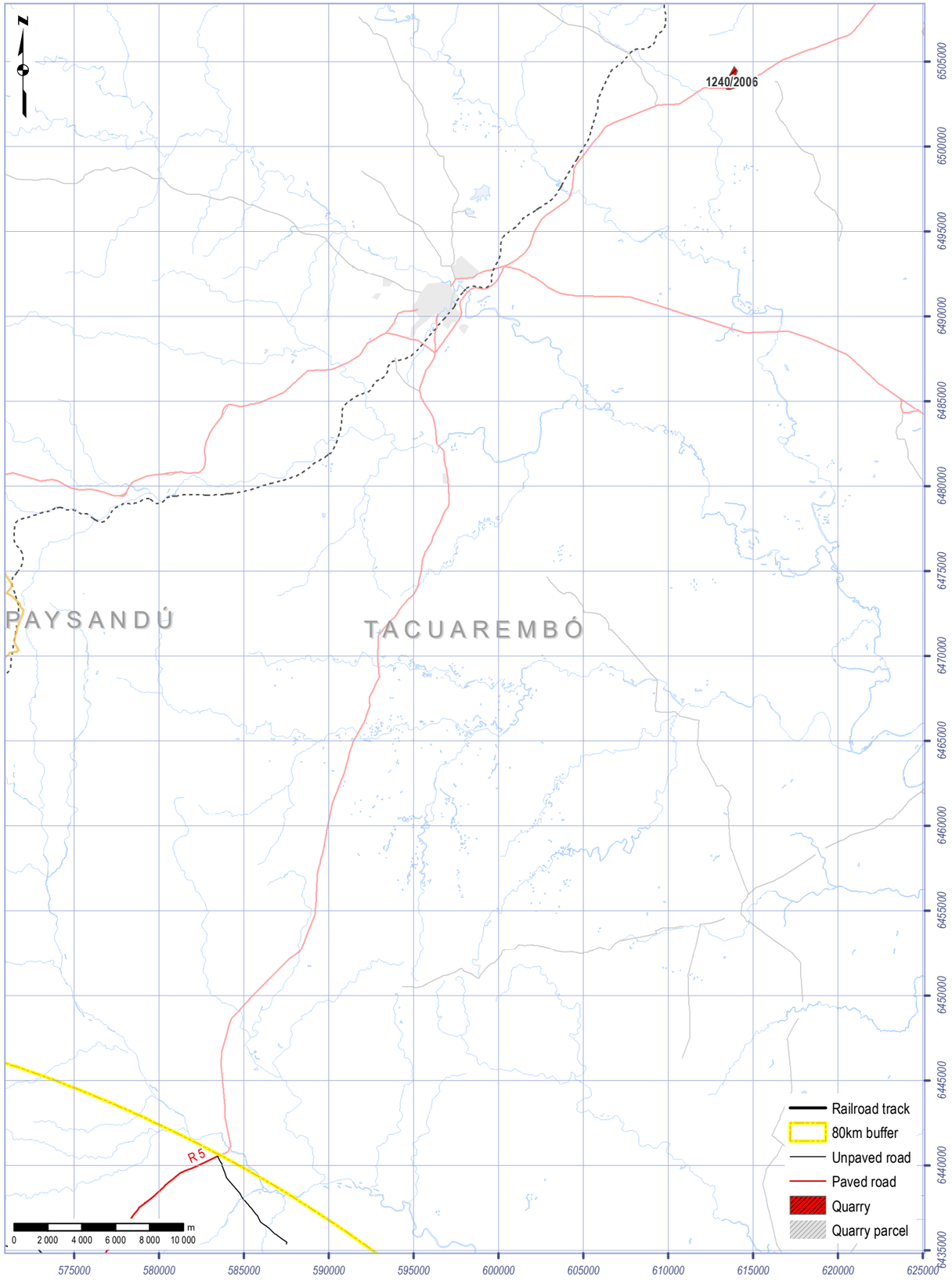

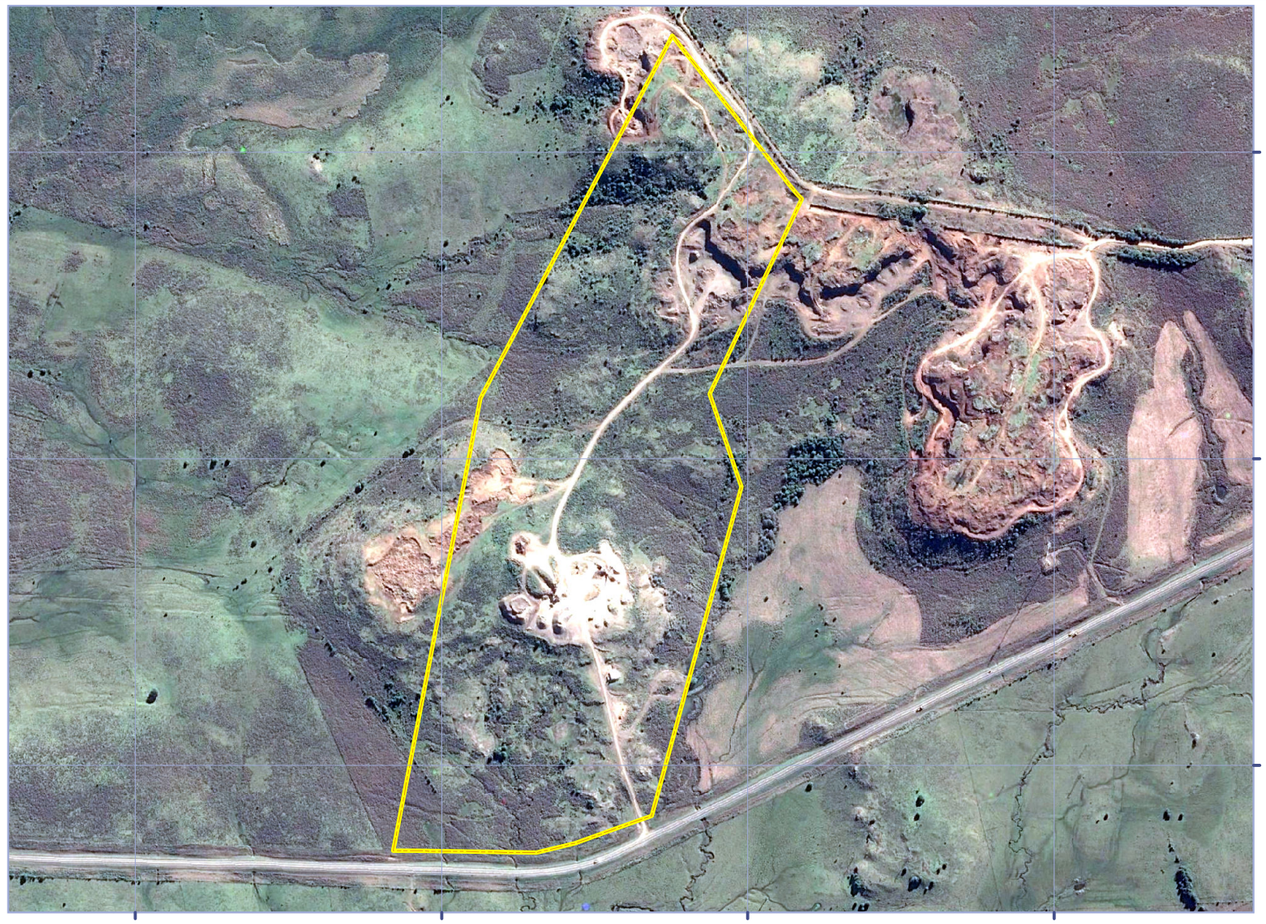

Quarry ID:	**As.1240/2006**	Closer railroad point:	**+273.7km**
Location (UTM):	**613750 - 6503740**	PAV road distance:	**175.5km**
Location (geographic):	**Tacuarembó**	UNPAV road distance:	**-**
Parcel:	**810 (5) - Tacuarembó**	RailRoad distance:	**-**
Lithology:	**Basalt**		
Quarry area:	**528.249m2**		
Owner:	**Altos del Sur S.A.**		
Los Angeles test data:	**12%**		
Reserves:	**>100.000m3 bulk rock**		
Permit issues:	**Up to date**		

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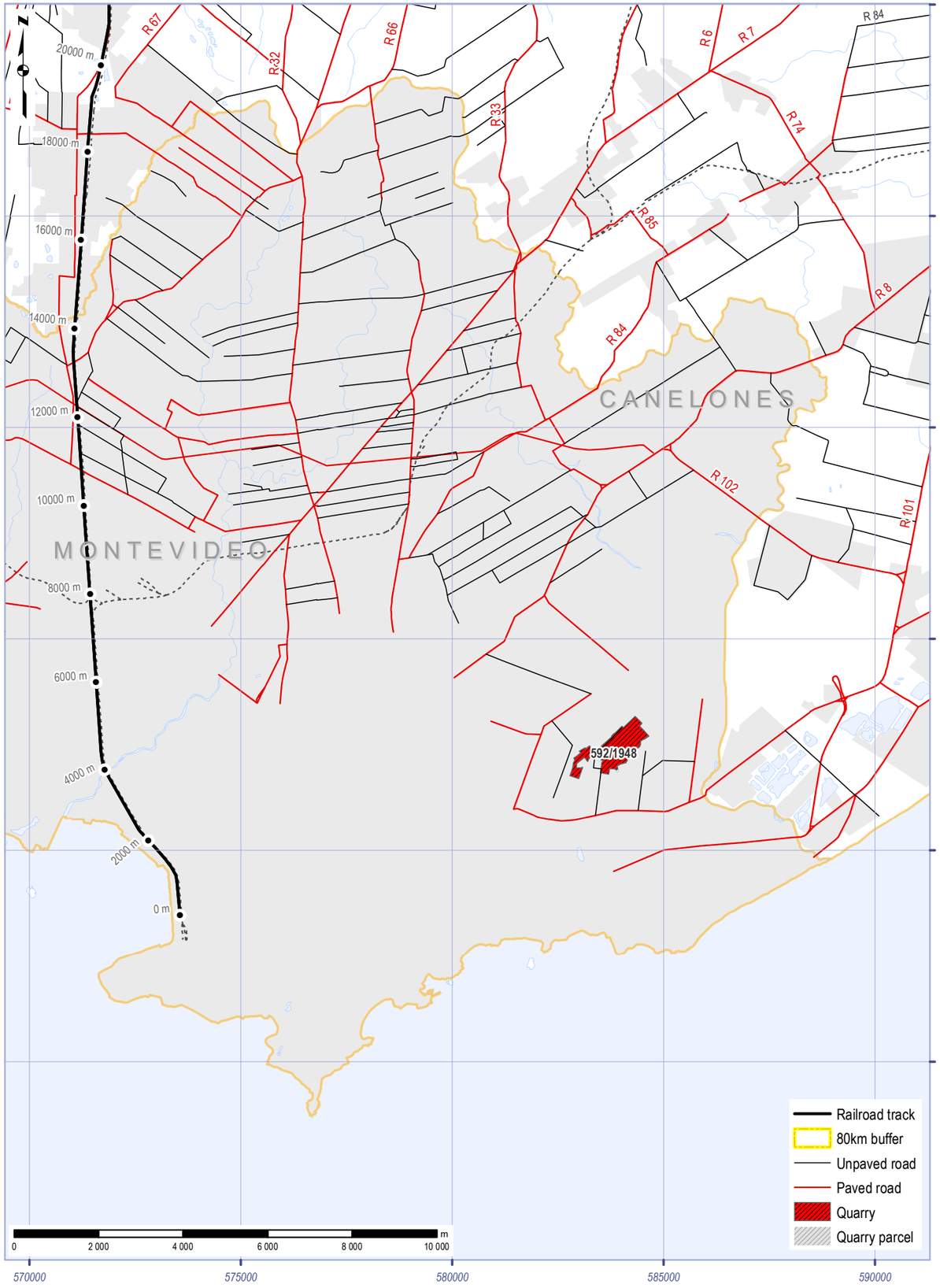

Quarry ID:	**As.592/1948**	Closer railroad point:	**+12.4km**
Location (UTM):	**583850 - 6142250**	PAV road distance:	**32.7km**
Location (geographic):	**Montevideo (Pavia Rd.)**	UNPAV road distance:	**1.8km**
Parcel:	**Several () - Montevideo**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**956.355m2**		
Owner:	**Canteras Montevideo S.A.**		
Los Angeles test data:	**12% ("F" graduation)**		
Reserves:	**> 1.200.000m3 bulk rock**		
Permit issues:	**Up to date**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

DINAMIGE As. 592/1948

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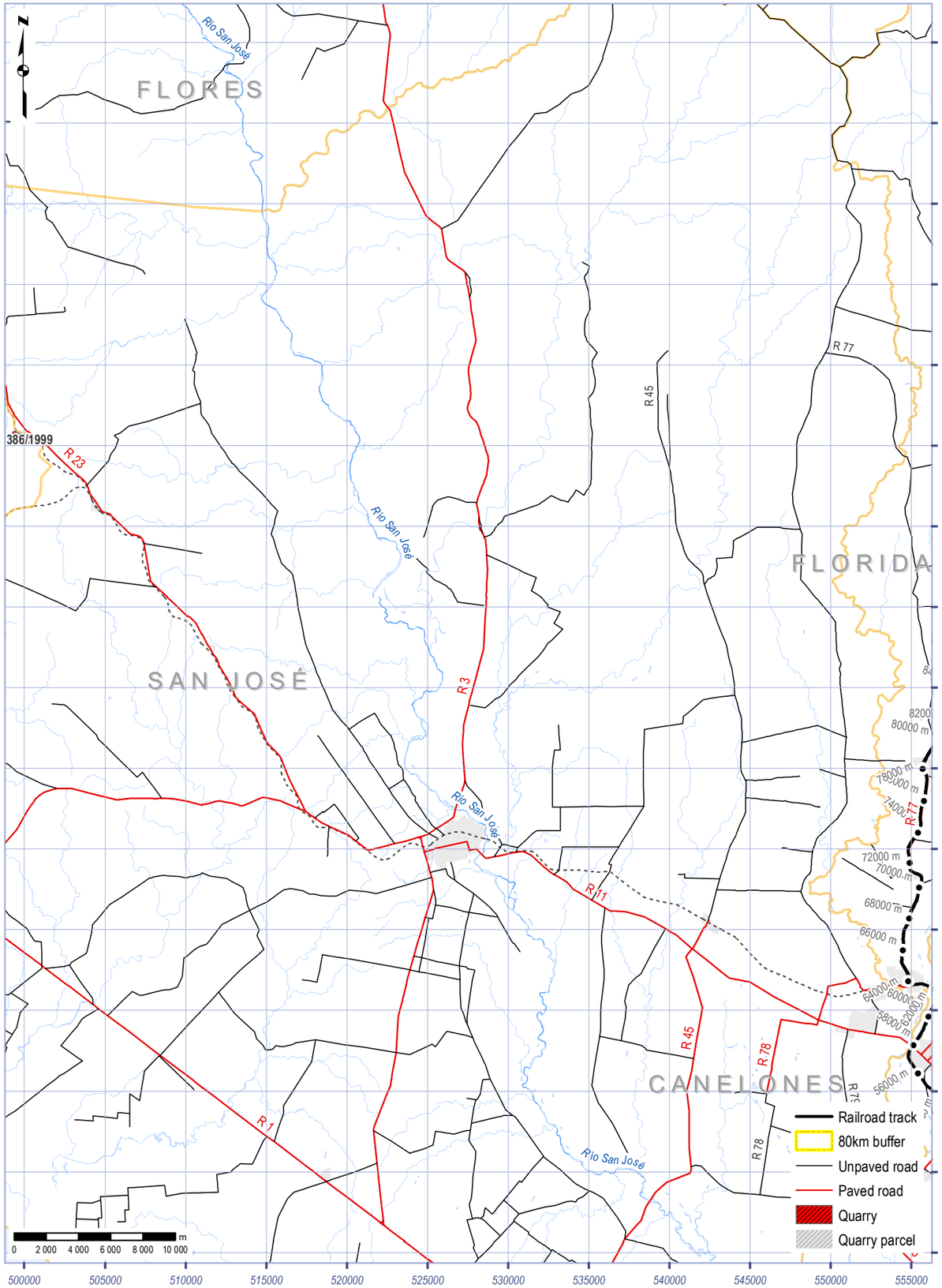

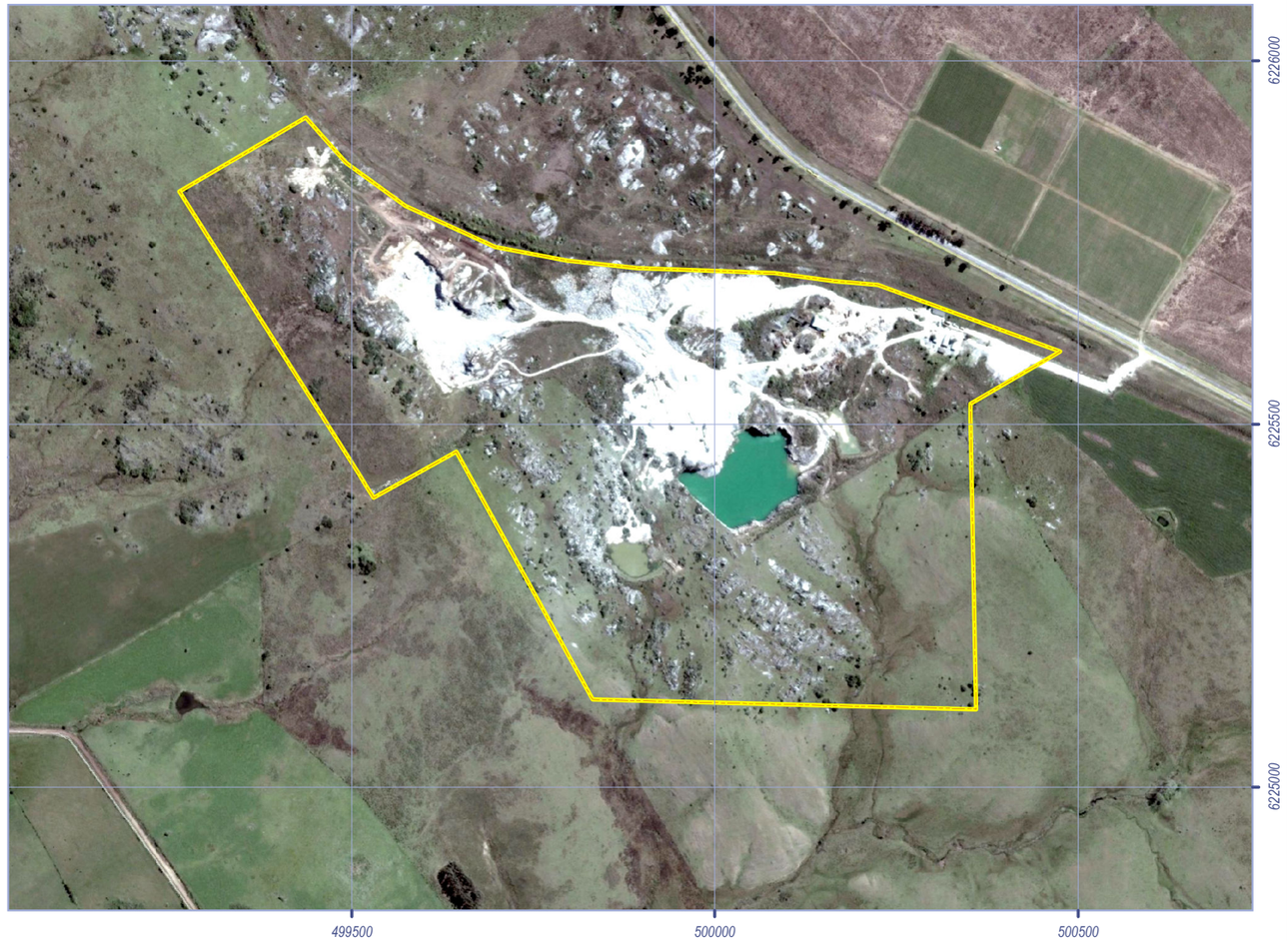

Quarry ID:	**As.386/1999**	Closer railroad point:	**+63.6km**
Location (UTM):	**500000 - 6225500**	PAV road distance:	**75.5km**
Location (geographic):	**Mal Abrigo**	UNPAV road distance:	**-**
Parcel:	**13836, 13837, 19, 96... (5) - Colonia**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**461.200m2**		
Owner:	**Teblix S.A.**		
Los Angeles test data:	**25% ("B" graduation - 14-20mm)**		
Reserves:	**> 350.000m3 bulk rock**		
Permit issues:	**Up to date**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

DINAMIGE As. 386/1999

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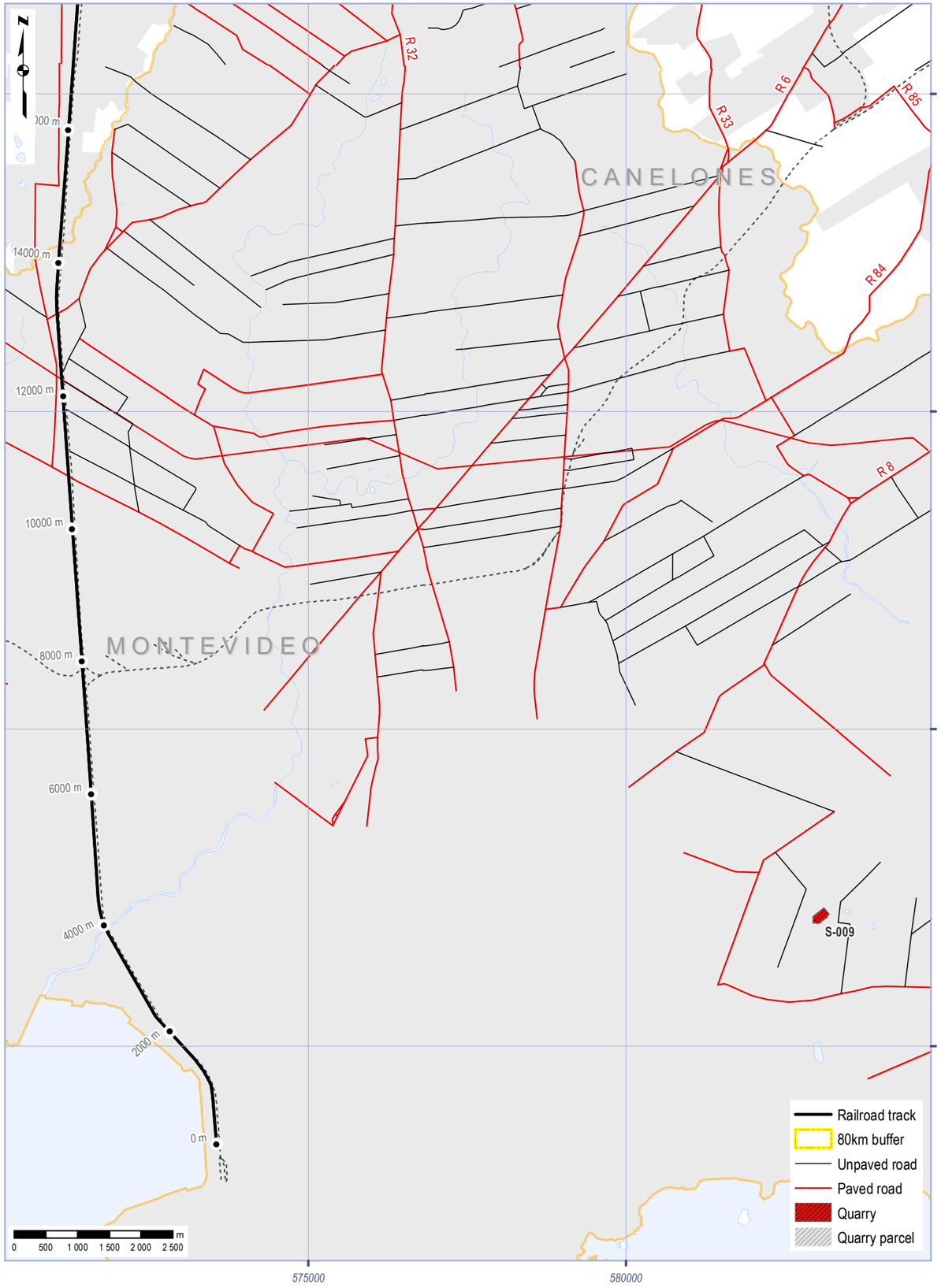

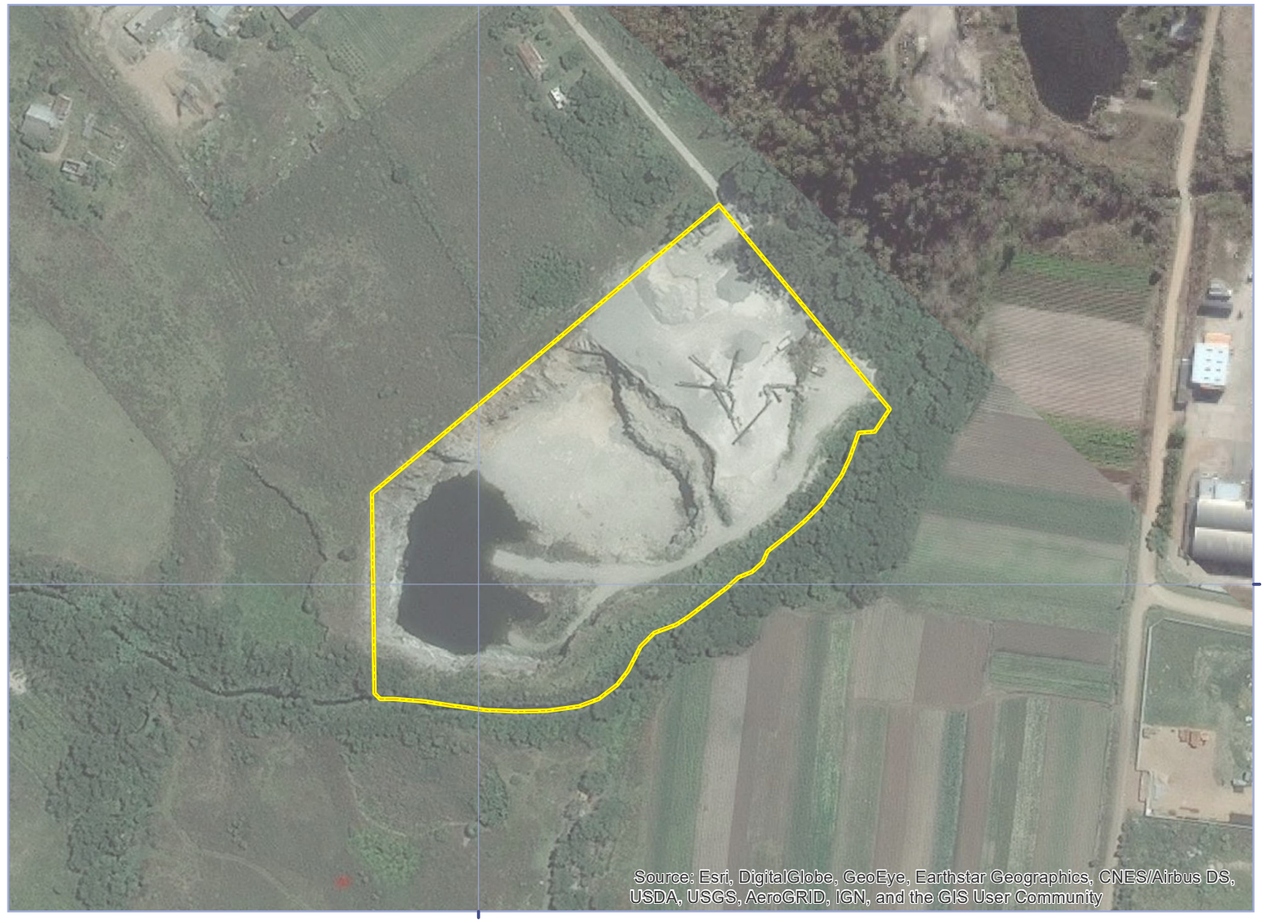

Quarry ID:	**S-009**	Closer railroad point:	**+12.4km**
Location (UTM):	**583060 - 6142040**	PAV road distance:	**32.7km + UPV**
Location (geographic):	**Cepeda Rd.**	UNPAV road distance:	**1.8km**
Parcel:	**121930 (10) - Montevideo**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**36.800m2**		
MTOP File:	**Exp.ND**		

Los Angeles test data:	**ND**
Reserves:	**Quarry at end of resources (< 10.000m3 bulk rock)**
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / S-009

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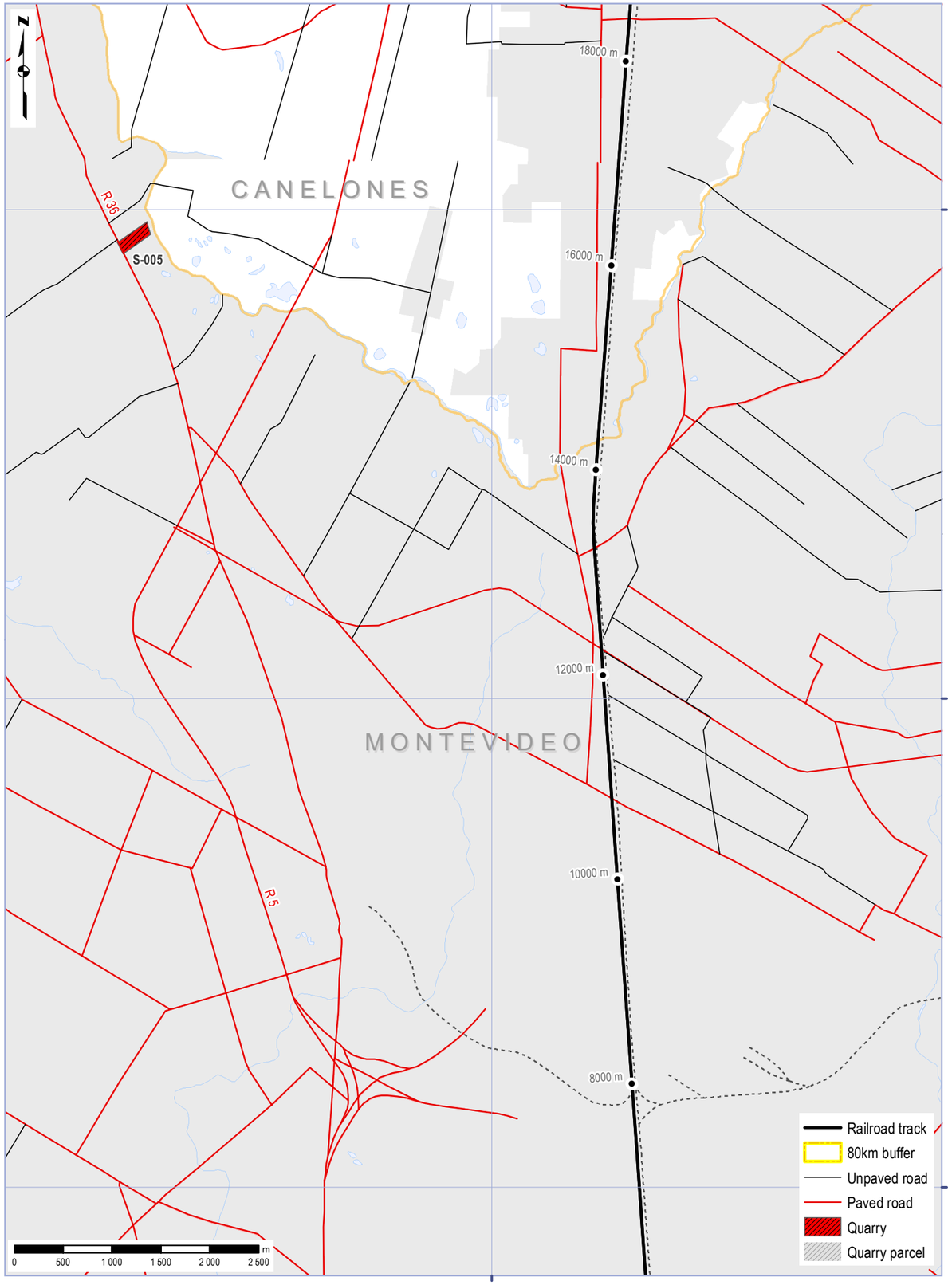

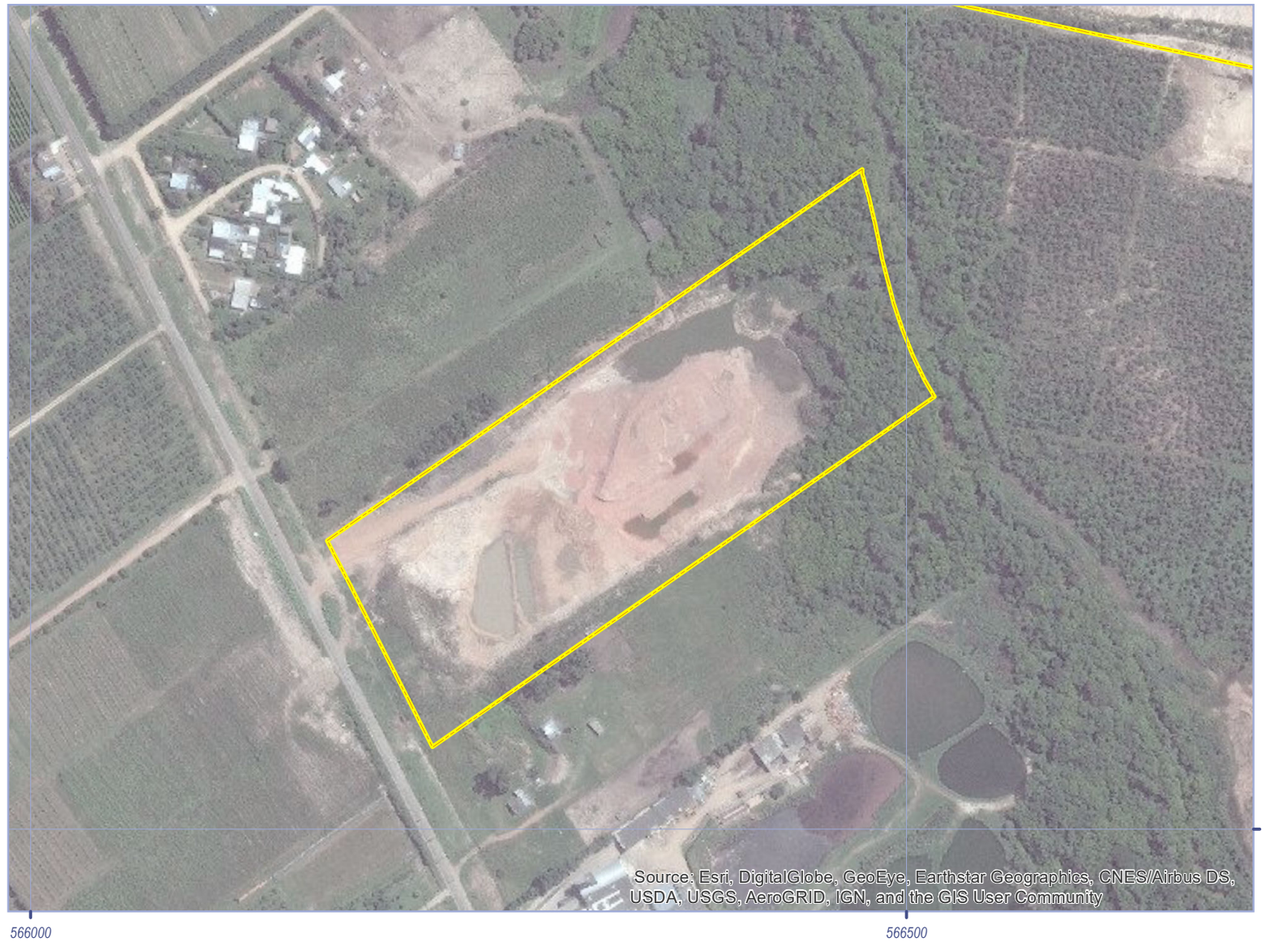

Quarry ID:	**S-005**	Closer railroad point:	**+12.4km**
Location (UTM):	**566350 - 6154700**	PAV road distance:	**12.4km + UPV**
Location (geographic):	**Melilla Rd.**	UNPAV road distance:	**-**
Parcel:	**141451 (9) - Montevideo**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**45.500m2**		
MTOP File:	**Exp.01/3/00509**		
Los Angeles test data:	**ND**		
Reserves:	**ND**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / S-005

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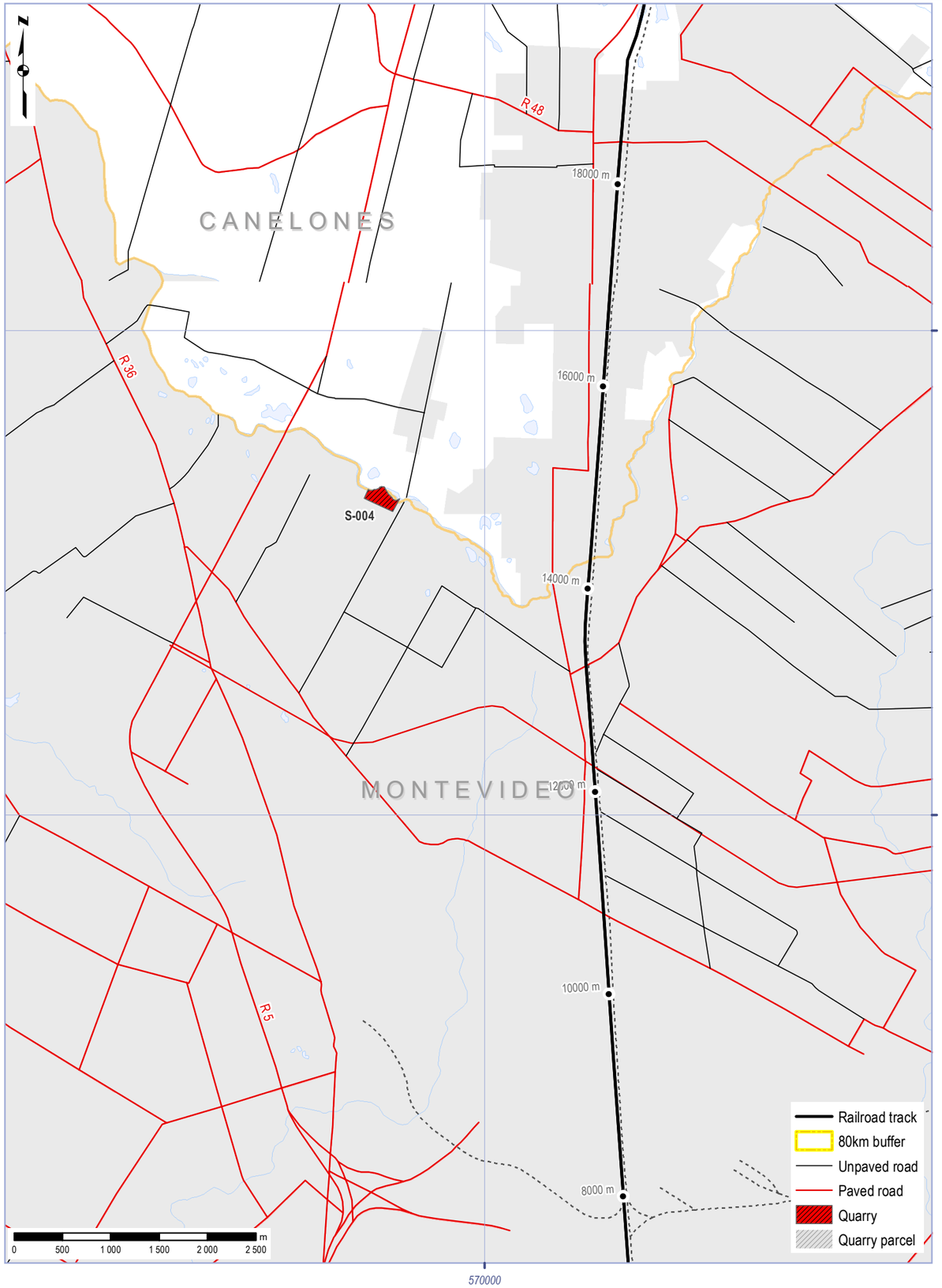

Quarry ID:	**S-004**	Closer railroad point:	**+12.4km**
Location (UTM):	**568930 - 6153250**	PAV road distance:	**3.6km + UPV**
Location (geographic):	**Aimara Rd.**	UNPAV road distance:	**2.3km**
Parcel:	**4859 (9) - Montevideo**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**46.900m2**		
MTOP File:	**Exp.01/3/00509 29/10/01**		
Los Angeles test data:	**ND**		
Reserves:	**ND**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / S-004

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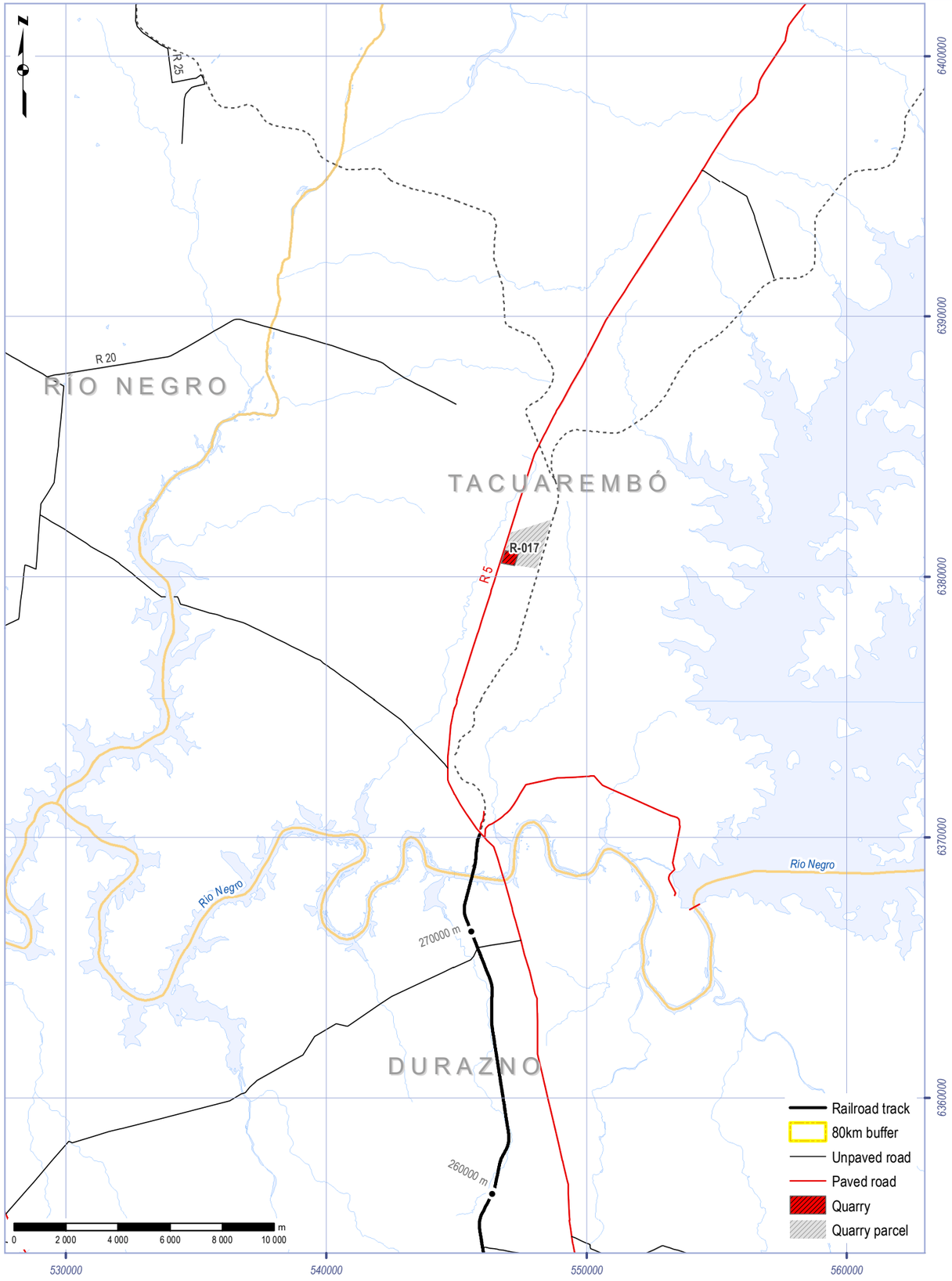

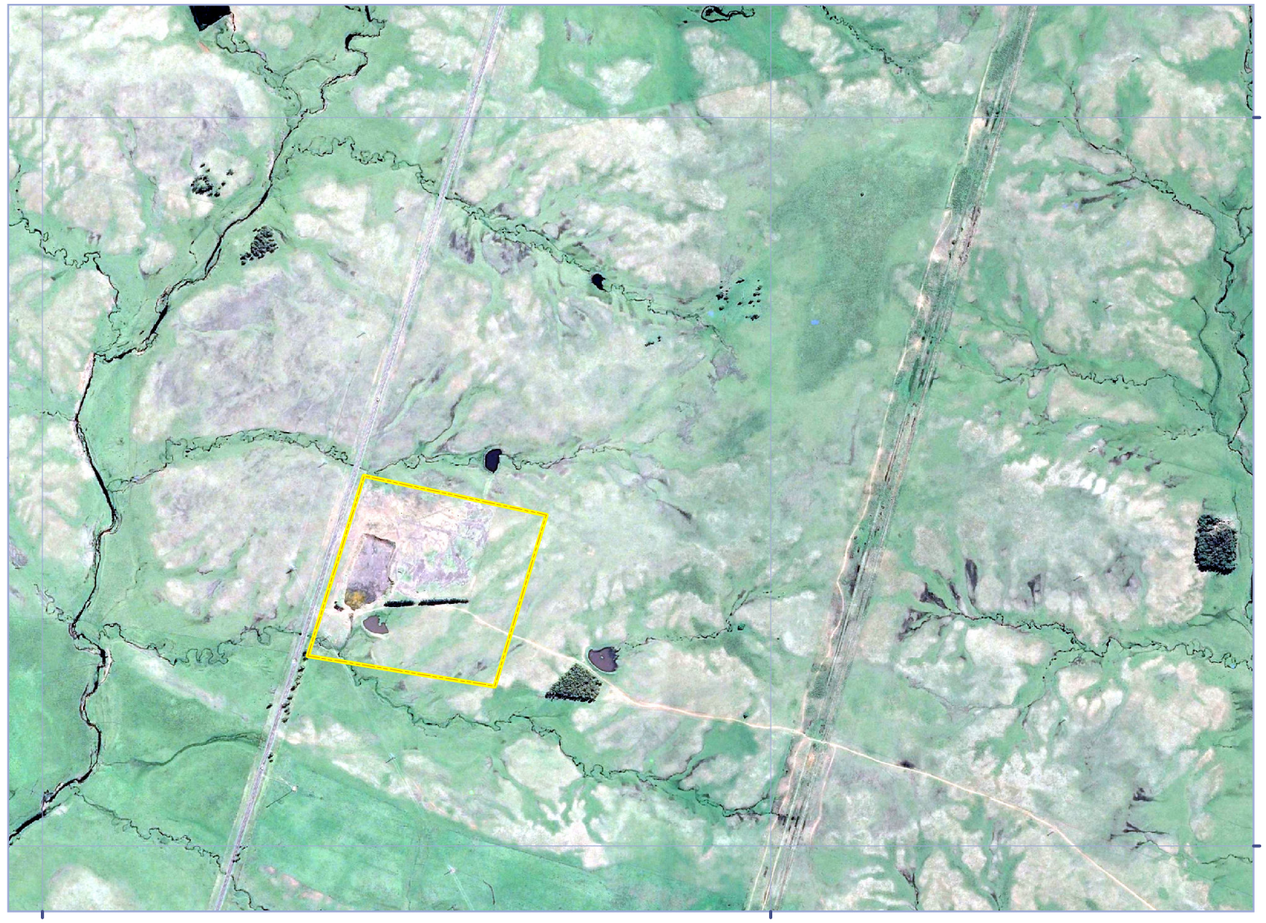

Quarry ID:	**R-017**	Closer railroad point:	**+273.7km**
Location (UTM):	**547060 - 6380720**	PAV road distance:	**11.4km**
Location (geographic):	**R5 - 262k000**	UNPAV road distance:	**1.2km + RR**
Parcel:	**2070 (10) - Tacuarembó**	RailRoad distance:	**11.9km**
Lithology:	**Basalt**		
Quarry area:	**20.000m2**		
MTOP File:	**Exp. 03/3/2592**		
Los Angeles test data:	**NA**		
Reserves:	**60.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / R-017

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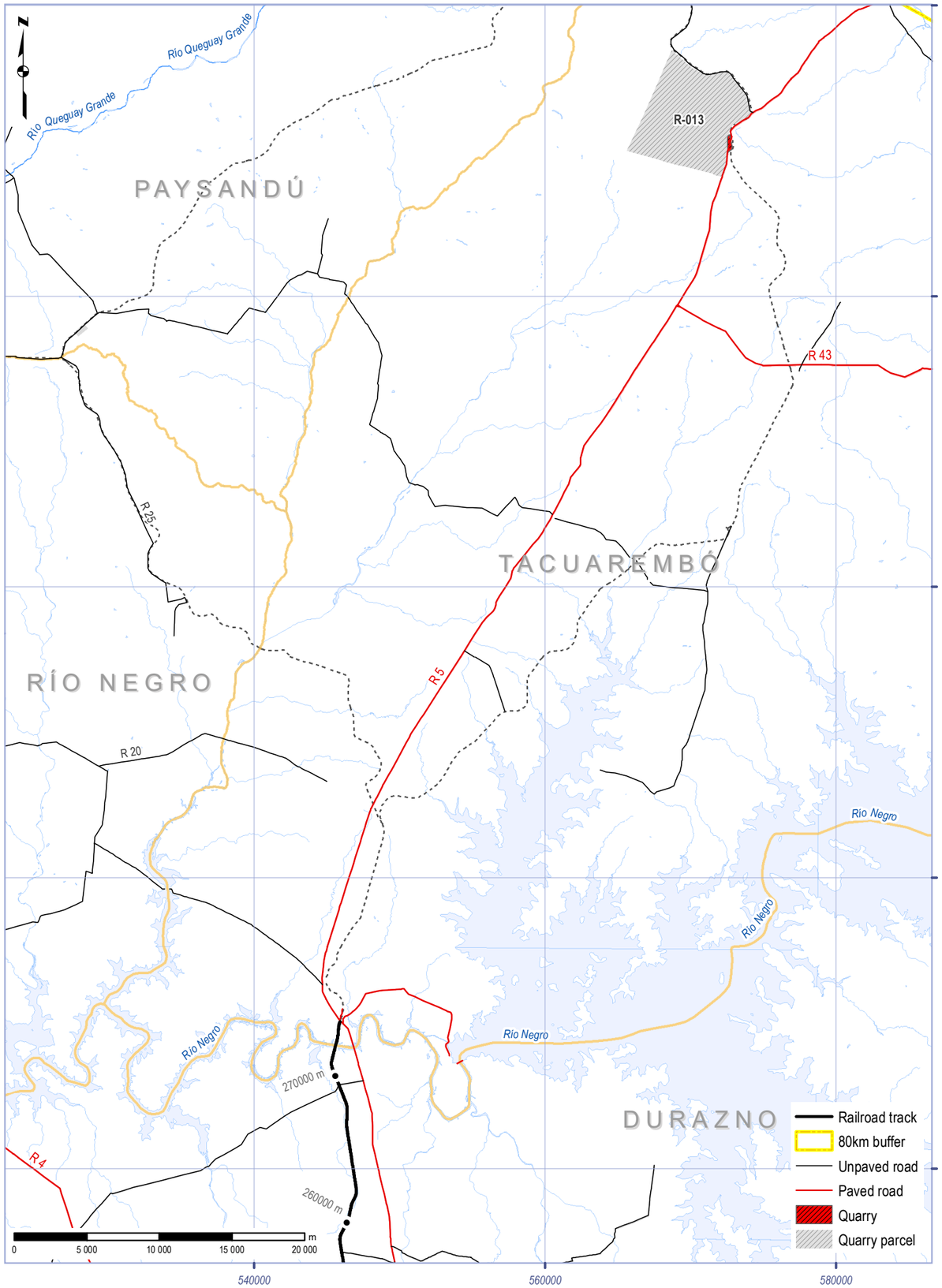

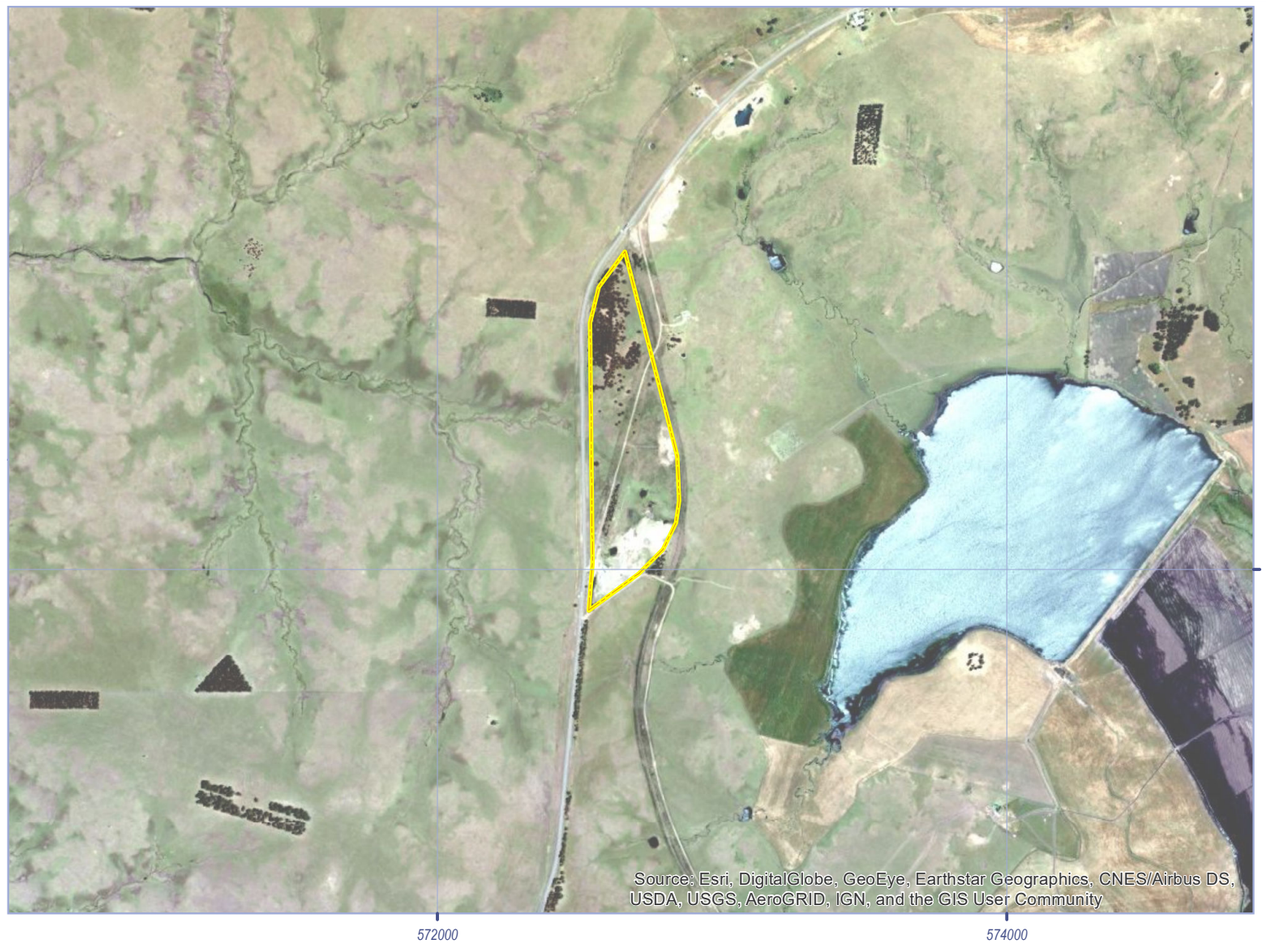

Quarry ID:	**R-013**	Closer railroad point:	**+273.7km**
Location (UTM):	**572670 - 6430440**	PAV road distance:	**68.5km**
Location (geographic):	**R5 - 319k500**	UNPAV road distance:	**-**
Parcel:	**2524 (11) - Tacuarembó**	RailRoad distance:	**81.5km**
Lithology:	**Basalt**		
Quarry area:	**20.000m2**		
MTOP File:	**22/6/00 Exp. 00/3/619**		
Los Angeles test data:	**NA**		
Reserves:	**< 30.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / R-013

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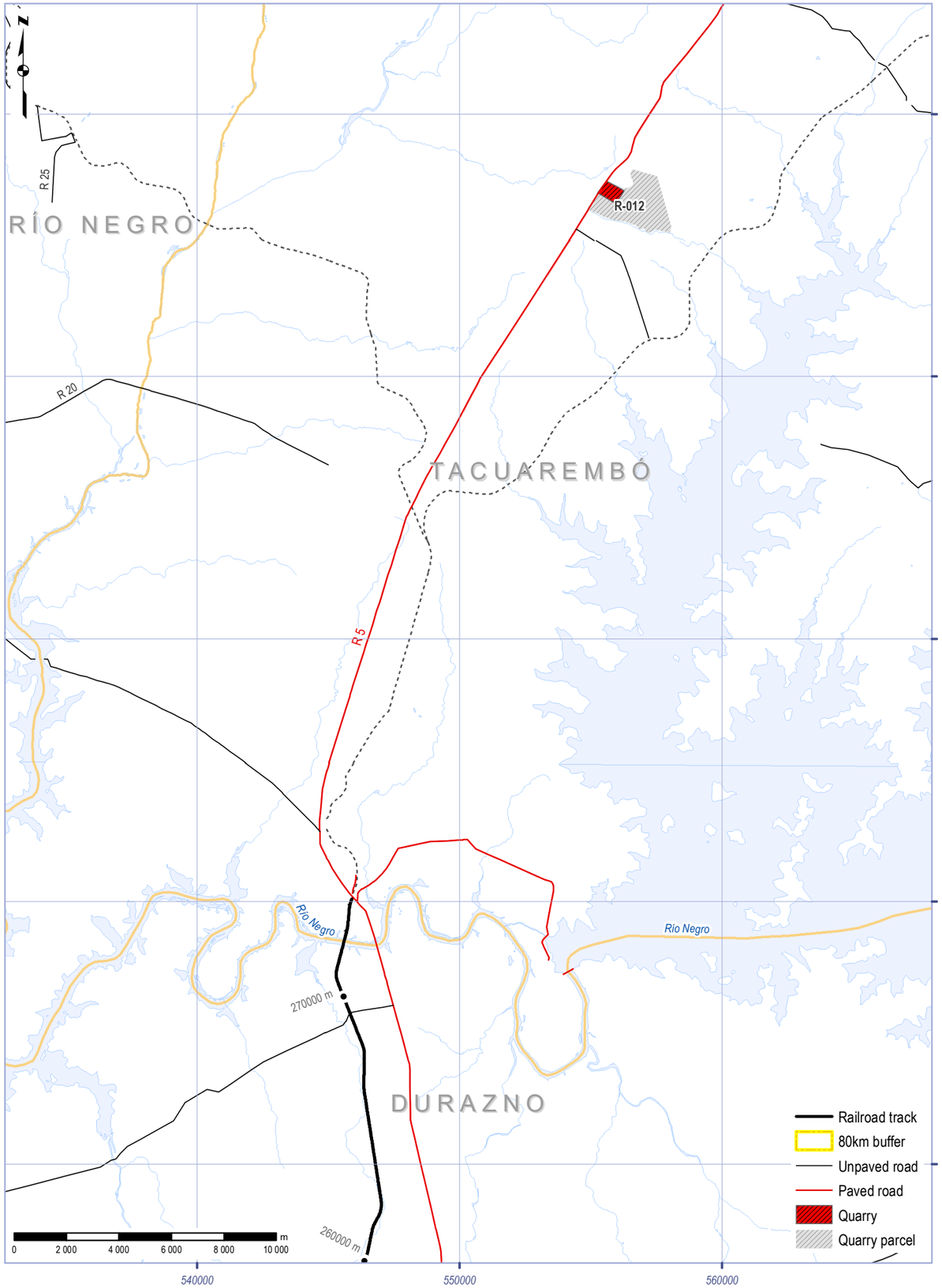

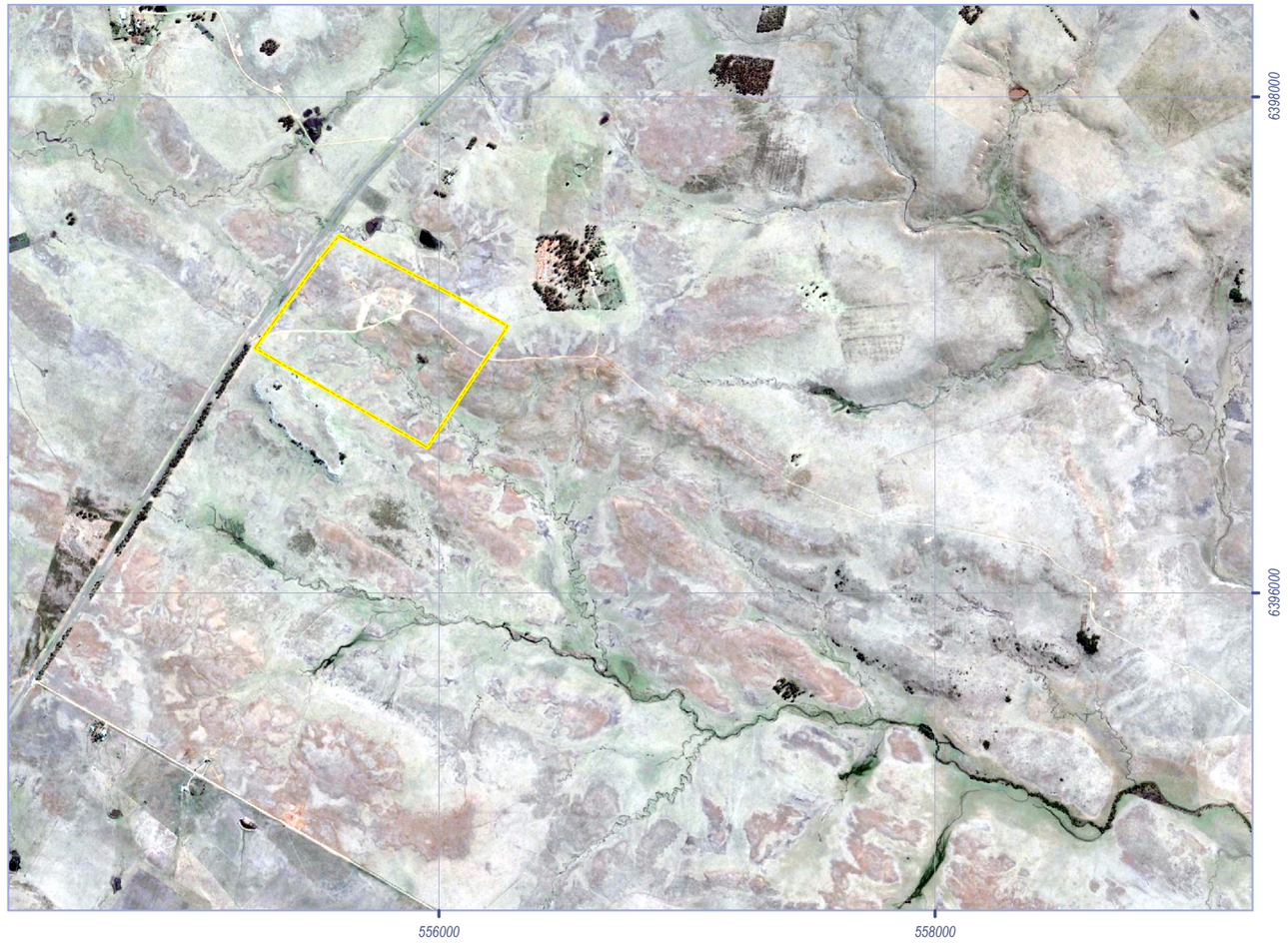

Quarry ID:	**R-012**	Closer railroad point:	**+273.7km**
Location (UTM):	**555700 - 6397140**	PAV road distance:	**29.5m**
Location (geographic):	**R5 - 280k200**	UNPAV road distance:	**-**
Parcel:	**12160 (10) - Tacuarembó**	RailRoad distance:	**-**
Lithology:	**Basalt**		
Quarry area:	**40.000m2**		
MTOP File:	**Exp. 00/3/547**		
Los Angeles test data:	**NA**		
Reserves:	**36.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / R-012

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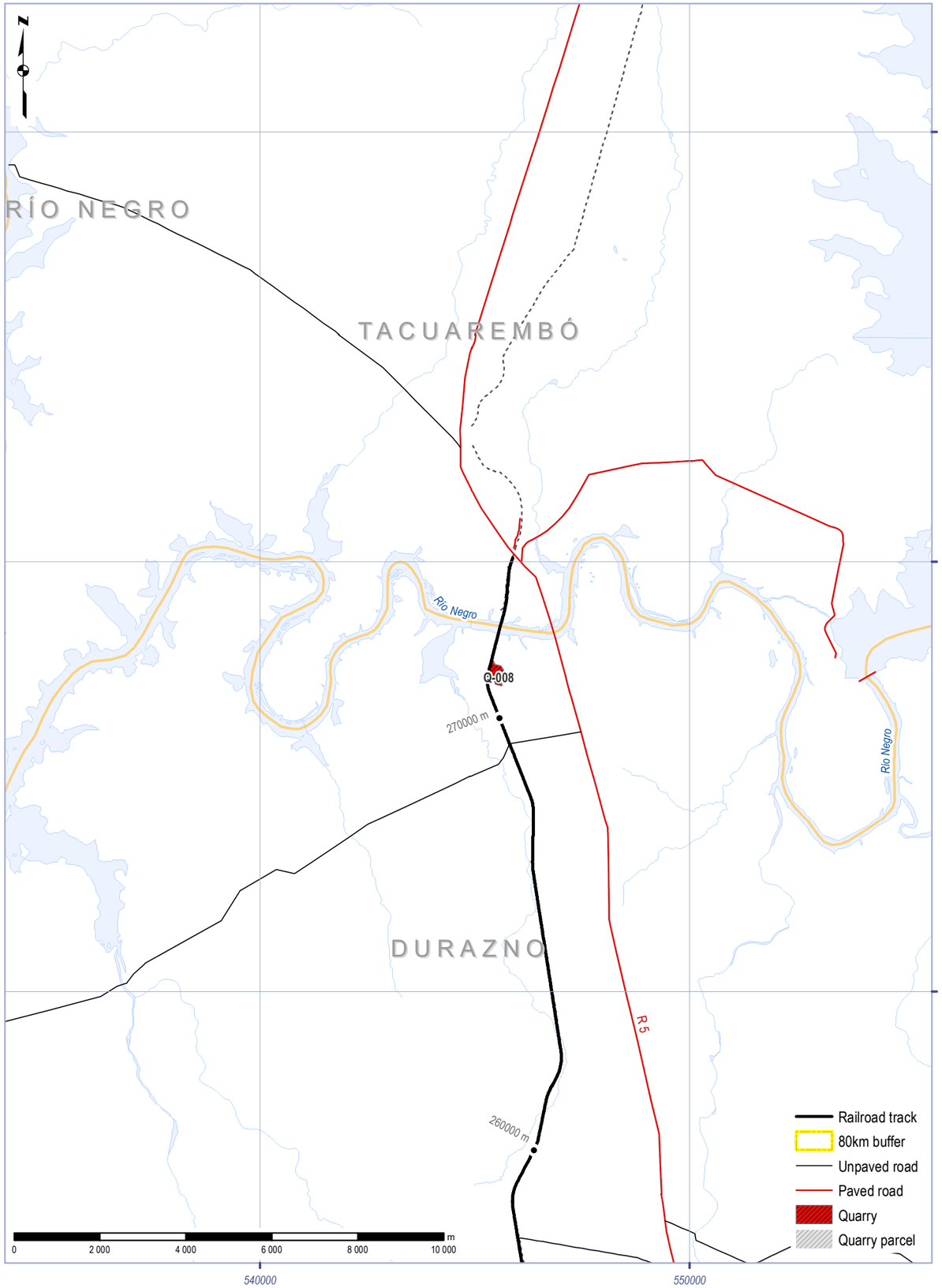

Quarry ID:	**Q-008**	Closer railroad point:	**+271.2km**
Location (UTM):	**545510 - 6367415**	PAV road distance:	**-**
Location (geographic):	**R5 - 246k000**	UNPAV road distance:	**-**
Parcel:	**7507 (11) - Durazno**	RailRoad distance:	**0.0km**
Lithology:	**Basalt**		
Quarry area:	**104.100m2**		
MTOP File:	**Exp. 2016/10/03/2875**		
Los Angeles test data:	**NA**		
Reserves:	**150.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / Q-008

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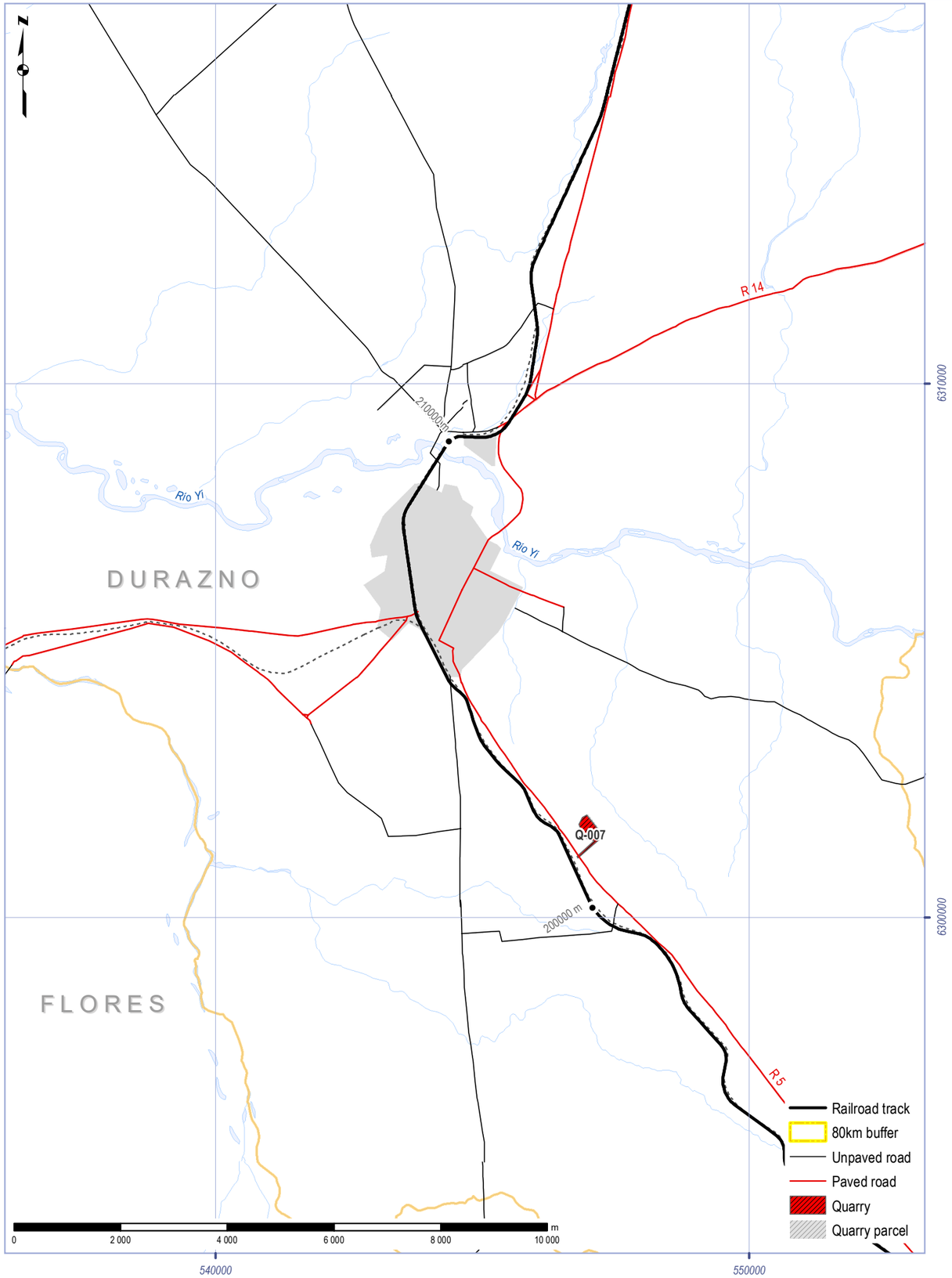

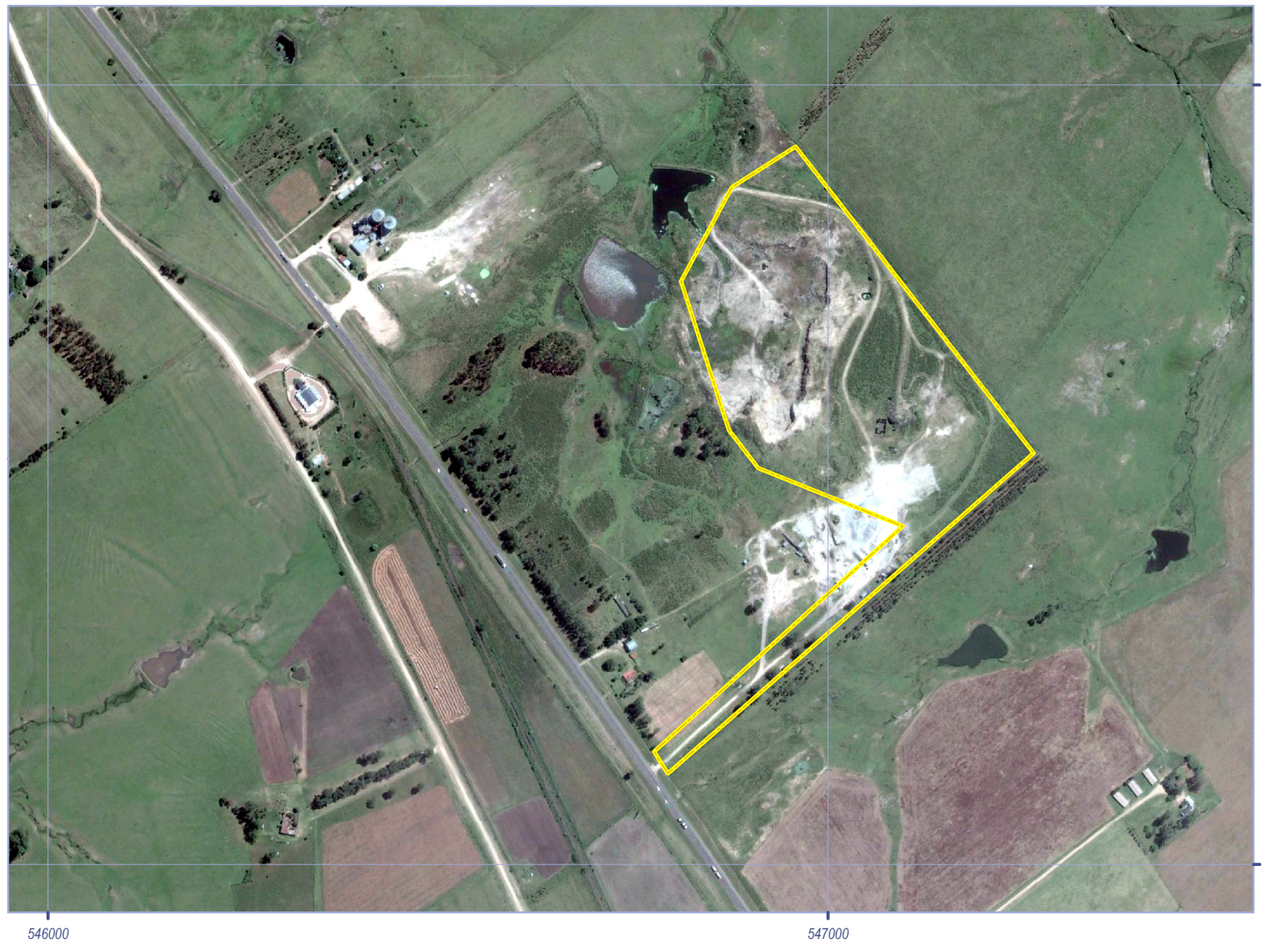

Quarry ID:	**Q-007**	Closer railroad point:	**+199.4km**
Location (UTM):	**546960 - 6301620**	PAV road distance:	**1.2km + UPV**
Location (geographic):	**R5 - 178k500**	UNPAV road distance:	**0.5km**
Parcel:	**8363 (1) - Durazno**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**100.000m2**		
MTOP File:	**Exp. 2011/003/2614**		
Los Angeles test data:	**26.1 %**		
Reserves:	**>350.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / Q-007

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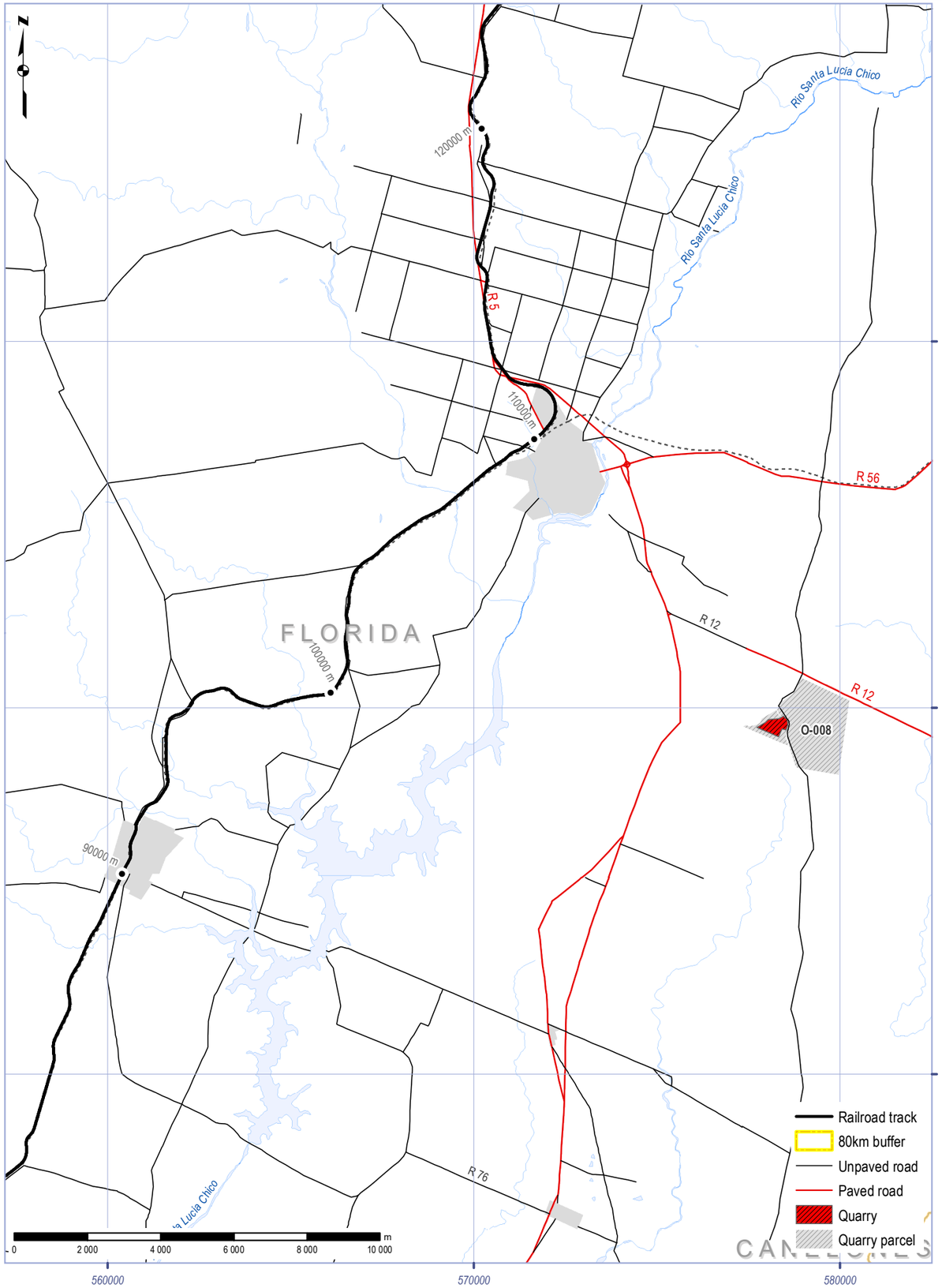

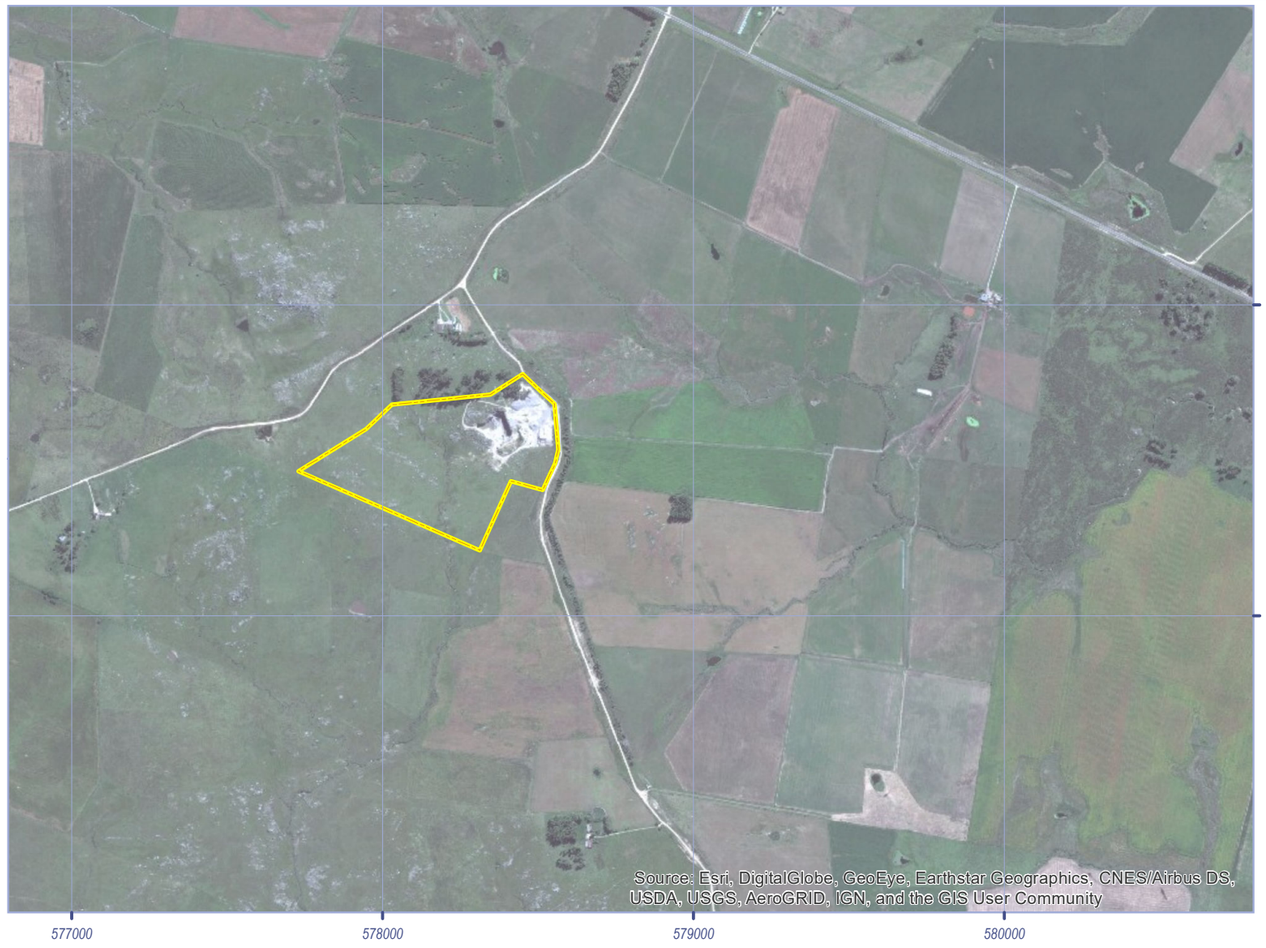

Quarry ID:	**O-008**	Closer railroad point:	**+111.9km**
Location (UTM):	**578400 - 6219600**	PAV road distance:	**11.7km**
Location (geographic):	**R12 - 4k200**	UNPAV road distance:	**2.1km**
Parcel:	**5482 (5) - Florida**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**136.000m2**		
MTOP File:	**Exp. 2009/03/2139**		
Los Angeles test data:	**NA**		
Reserves:	**>500.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / O-008

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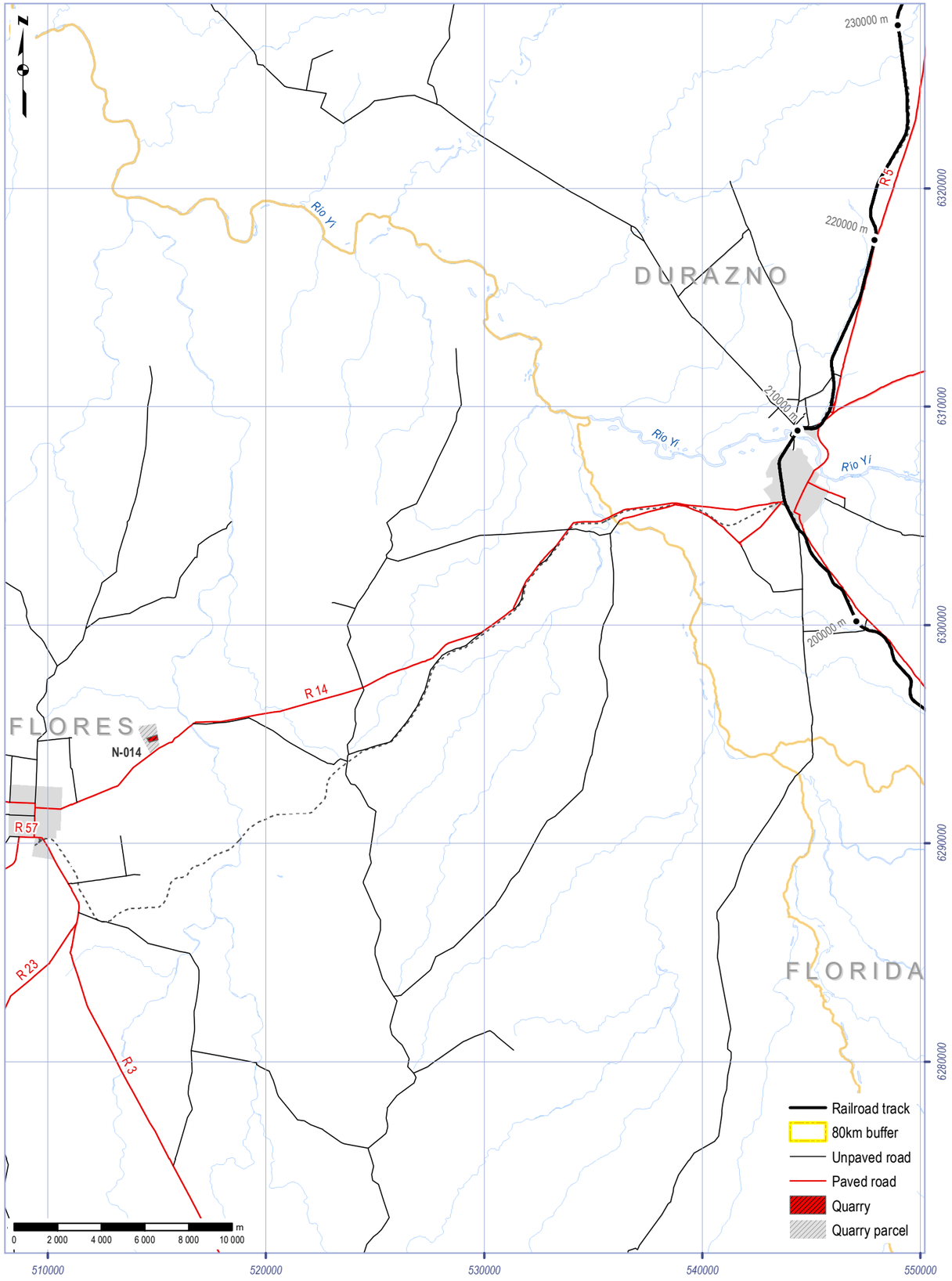

Quarry ID:	**N-014**	Closer railroad point:	**+206.5km**
Location (UTM):	**514740 - 6294780**	PAV road distance:	**34.6km**
Location (geographic):	**R14 - 141k000**	UNPAV road distance:	**0.5km**
Parcel:	**1278 (1) - Flores**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**20.000m2**		
MTOP File:	**ND**		
Los Angeles test data:	**NA**		
Reserves:	**120.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / N-014

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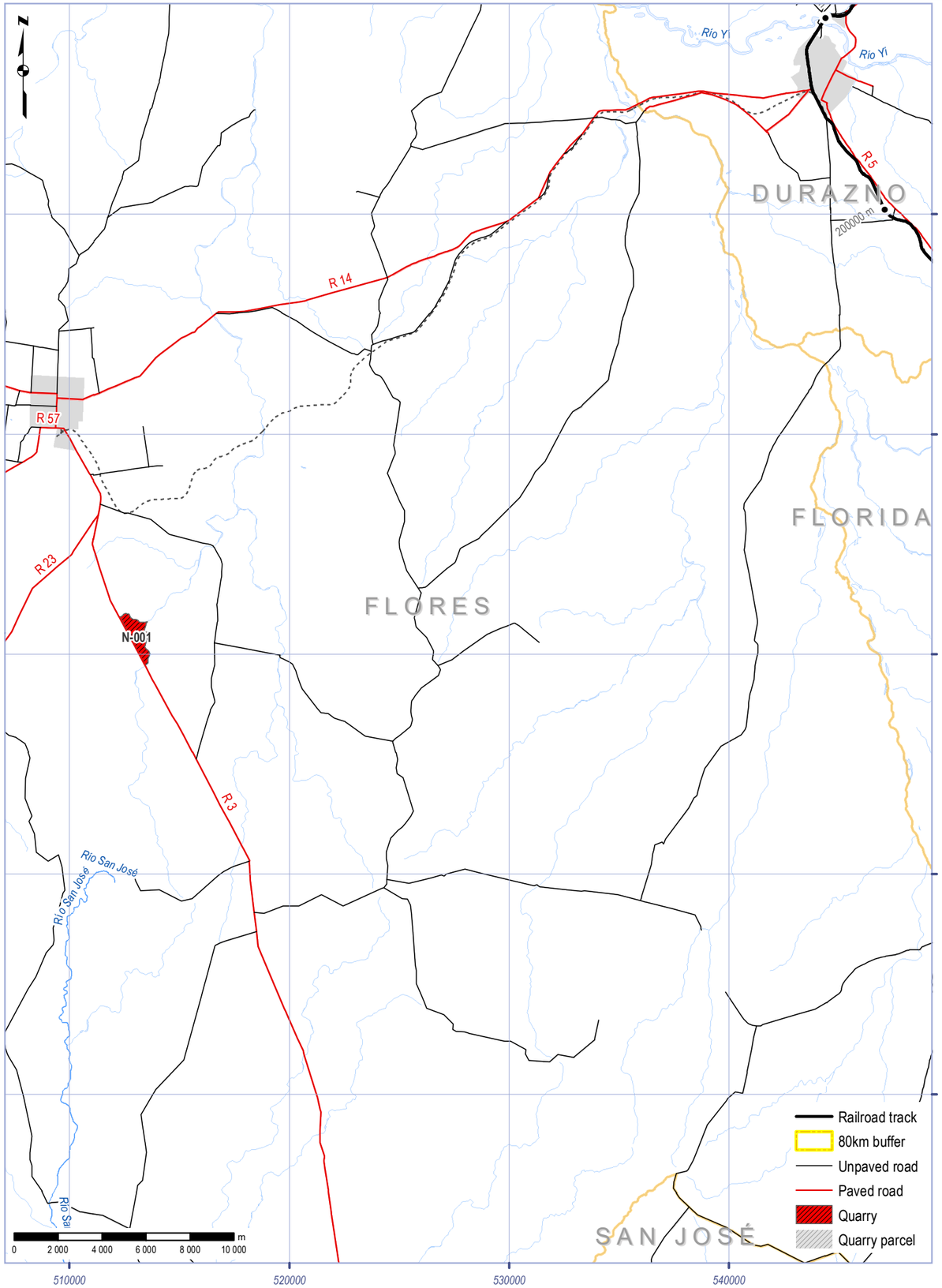

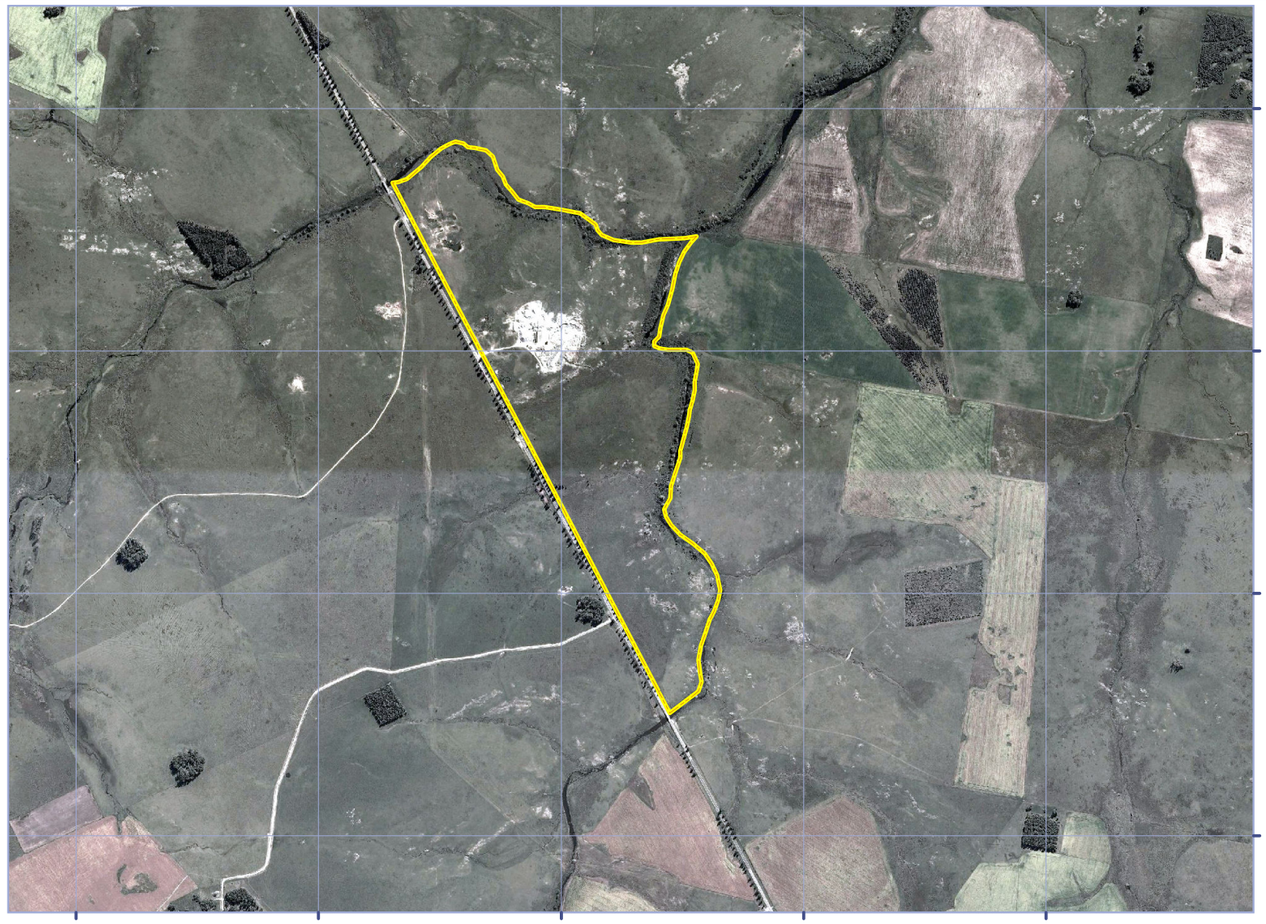

Quarry ID:	**N-001**	Closer railroad point:	**+206.5km**
Location (UTM):	**512960 - 6281030**	PAV road distance:	**52.4km**
Location (geographic):	**R3 - 178k700**	UNPAV road distance:	**-**
Parcel:	**691 & 4628 (2) - Flores**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**50.000m2**		
MTOP File:	**Exp. 2010/3/1617**		
Los Angeles test data:	**NA**		
Reserves:	**>400.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / N-001

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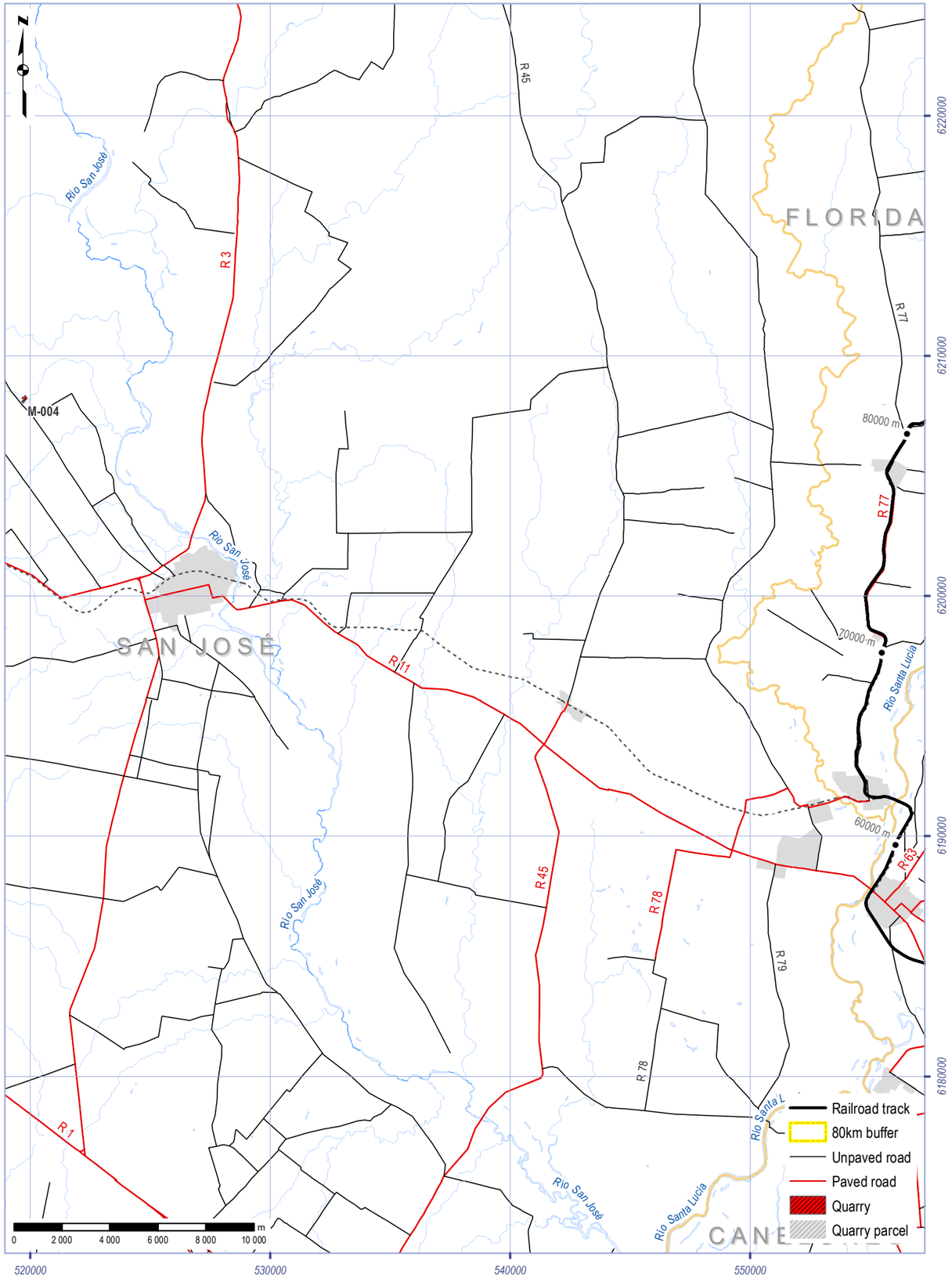

Quarry ID:	**M-004**	Closer railroad point:	**+63.6km**
Location (UTM):	**519790 - 6208240**	PAV road distance:	**38.4km + UPV**
Location (geographic):	**R3 - 92k700**	UNPAV road distance:	**9.0km**
Parcel:	**9773 (7) - San José**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**10.700m2**		
MTOP File:	**Exp.NA**		
Los Angeles test data:	**ND**		
Reserves:	**±50.000 m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / M-004

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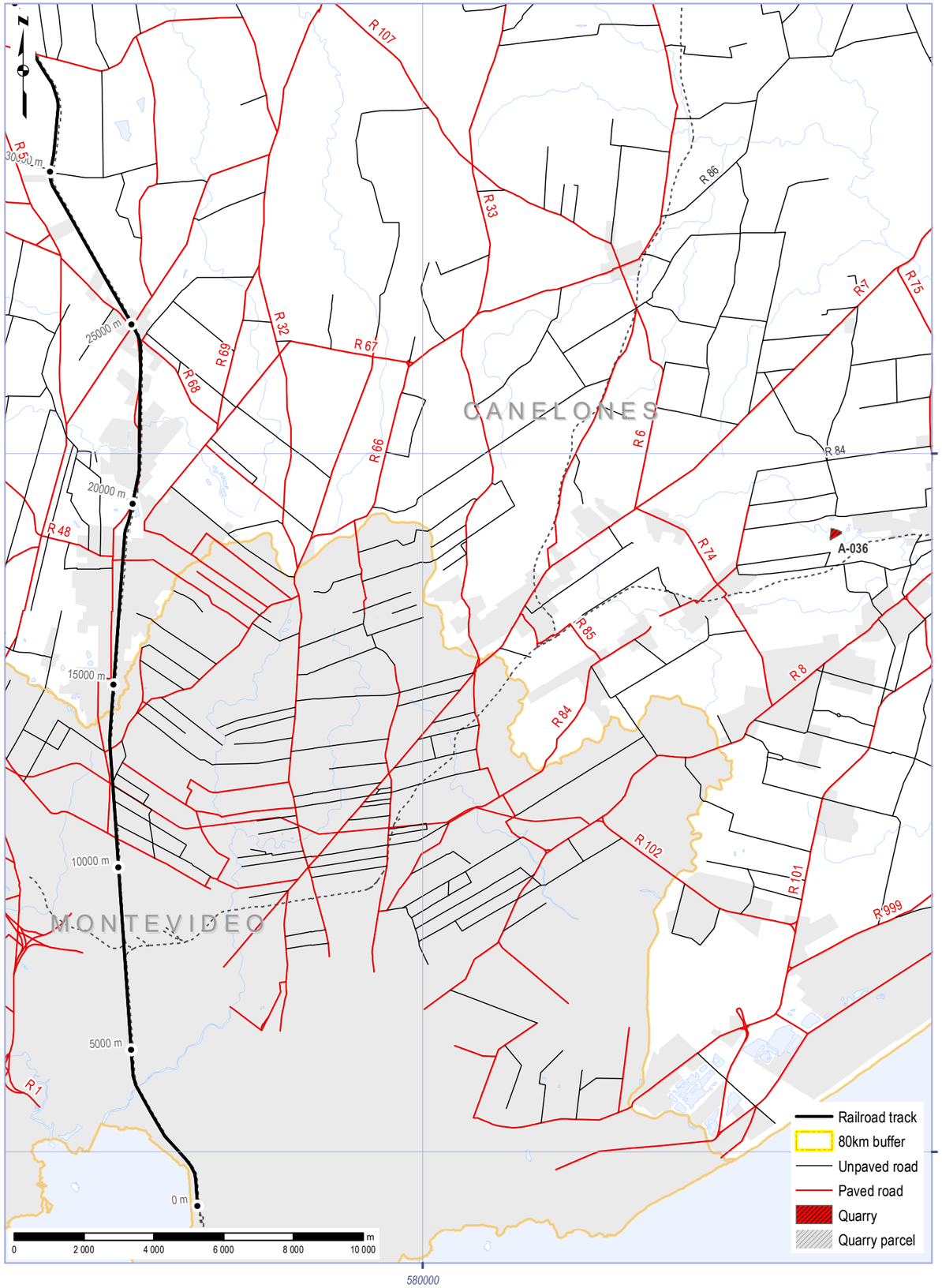

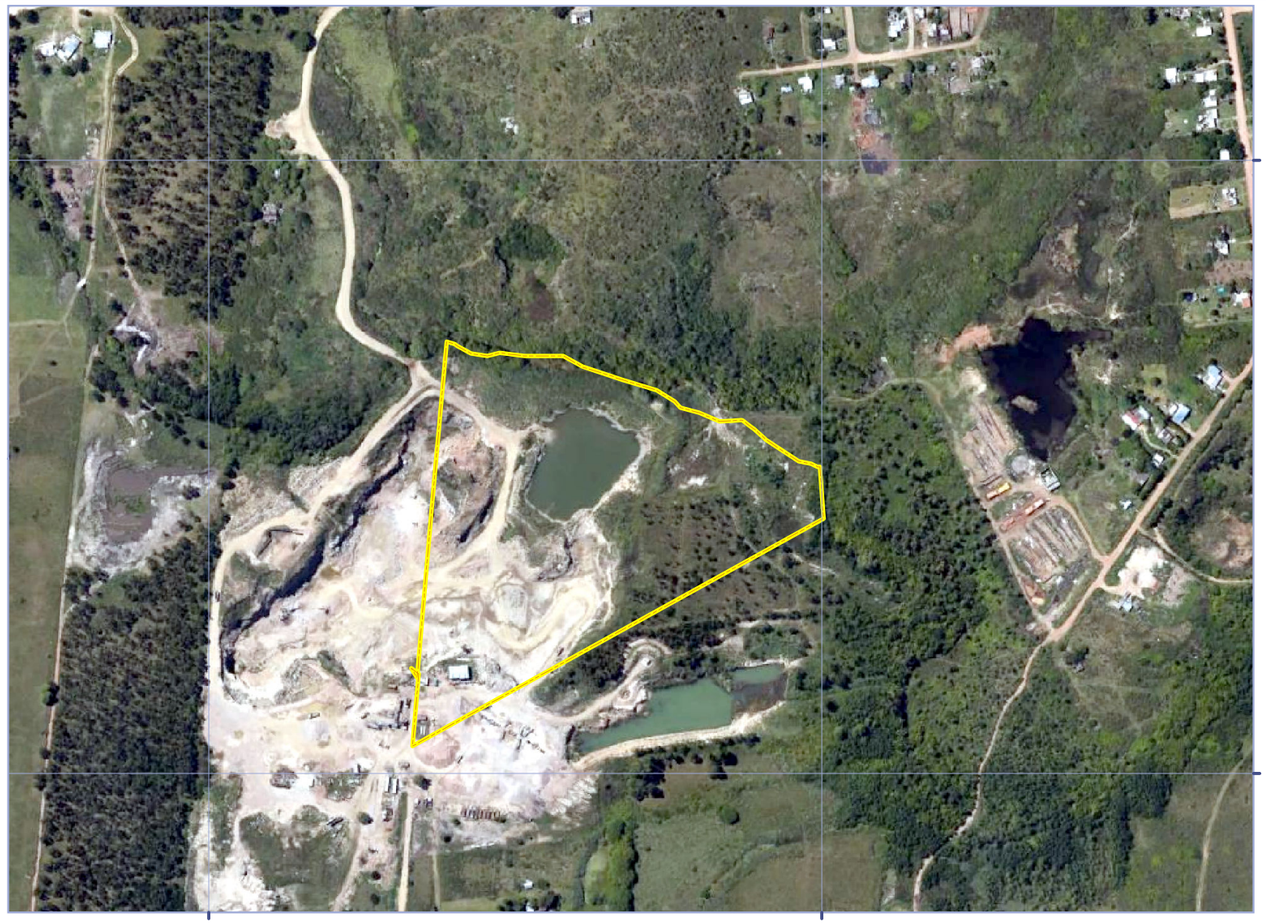

Quarry ID:	**A-036**	Closer railroad point:	**+12.4km**
Location (UTM):	**591800 - 6157700**	PAV road distance:	**26.6km + UPV**
Location (geographic):	**Suárez - Pando Rd.**	UNPAV road distance:	**3.1km**
Parcel:	**57415 (16) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**40.000m2**		
MTOP File:	**Exp.2010/3/616**		
Los Angeles test data:	**ND**		
Reserves:	**< 15.000m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / A-036

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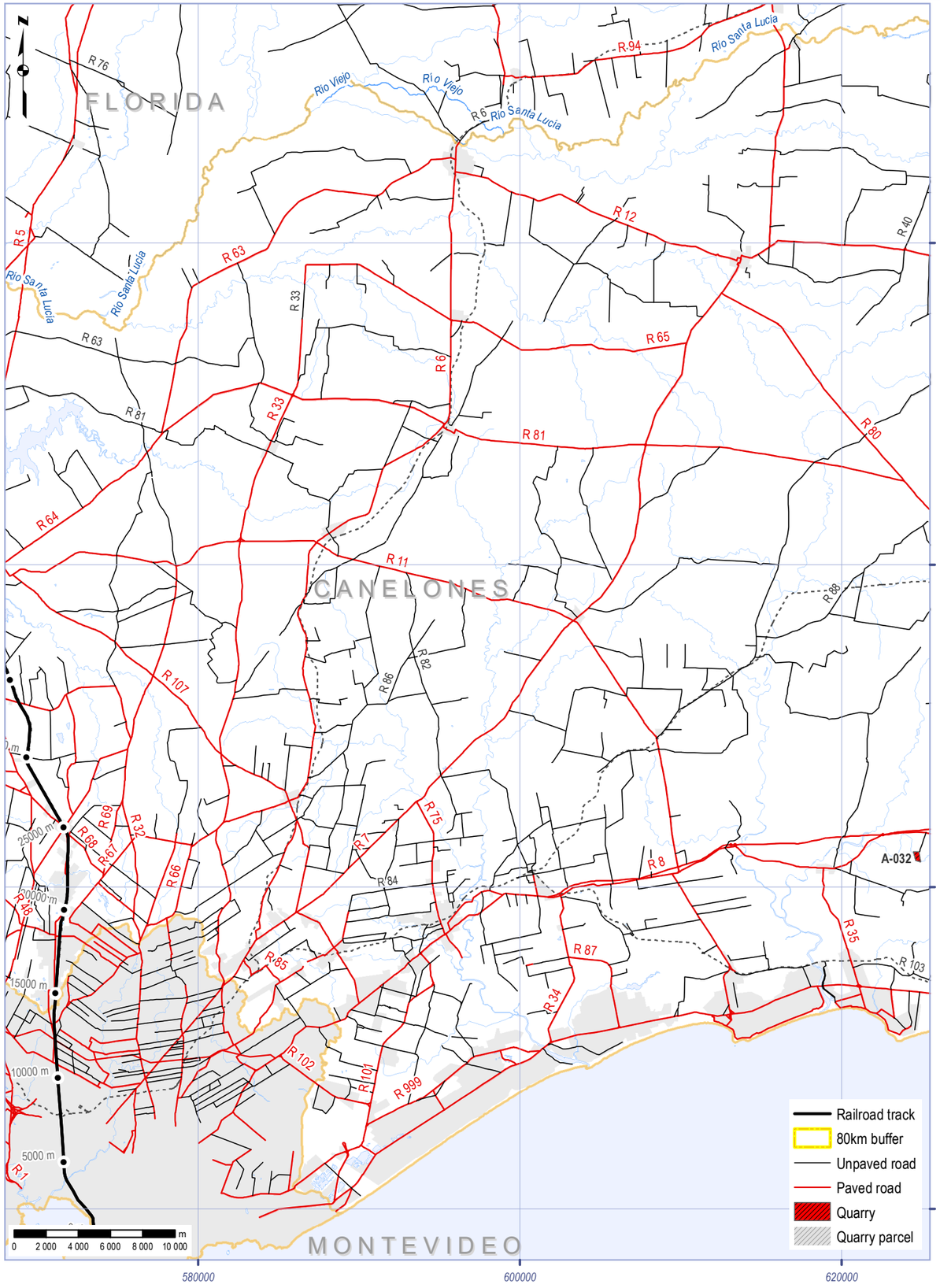

Quarry ID:	**A-032**	Closer railroad point:	**+12.4km**
Location (UTM):	**624770 - 6161900**	PAV road distance:	**61.0km + UPV**
Location (geographic):	**R8 62k000**	UNPAV road distance:	**1.5km**
Parcel:	**57837 (8) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**40.000m2**		
MTOP File:	**Exp.2015/10/03/00160**		
Los Angeles test data:	**ND**		
Reserves:	**± 300.000m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / A-032

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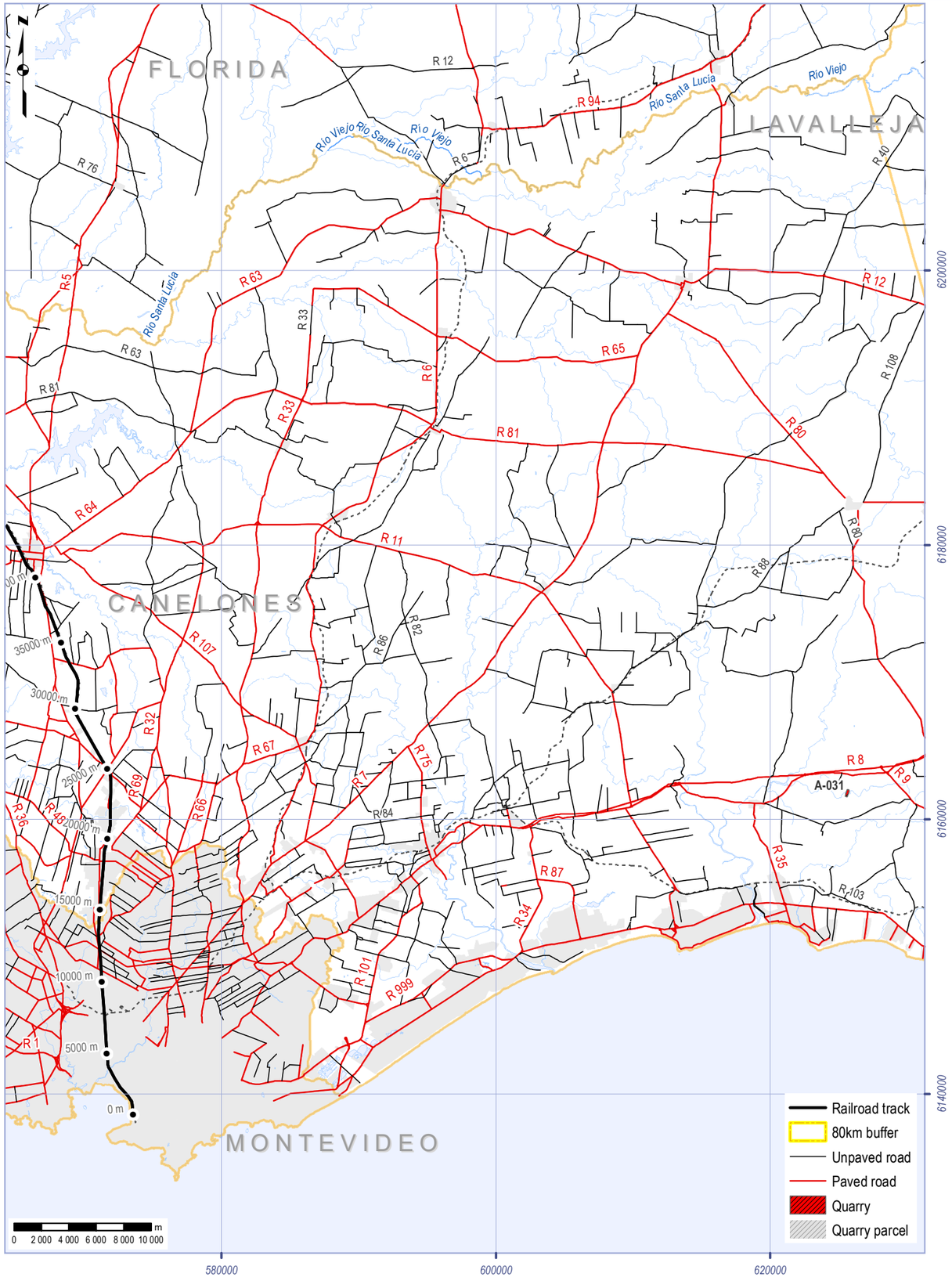

Quarry ID:	**A-031**	Closer railroad point:	**+12.4km**
Location (UTM):	**625615 - 6161950**	PAV road distance:	**61.3km + UPV**
Location (geographic):	**R8 63k000**	UNPAV road distance:	**2.4km**
Parcel:	**6090 (8) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**17.000m2**		
MTOP File:	**Exp.17/10/01**		
Los Angeles test data:	**ND**		
Reserves:	**< 70.000m3 bulk rock**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / A-031

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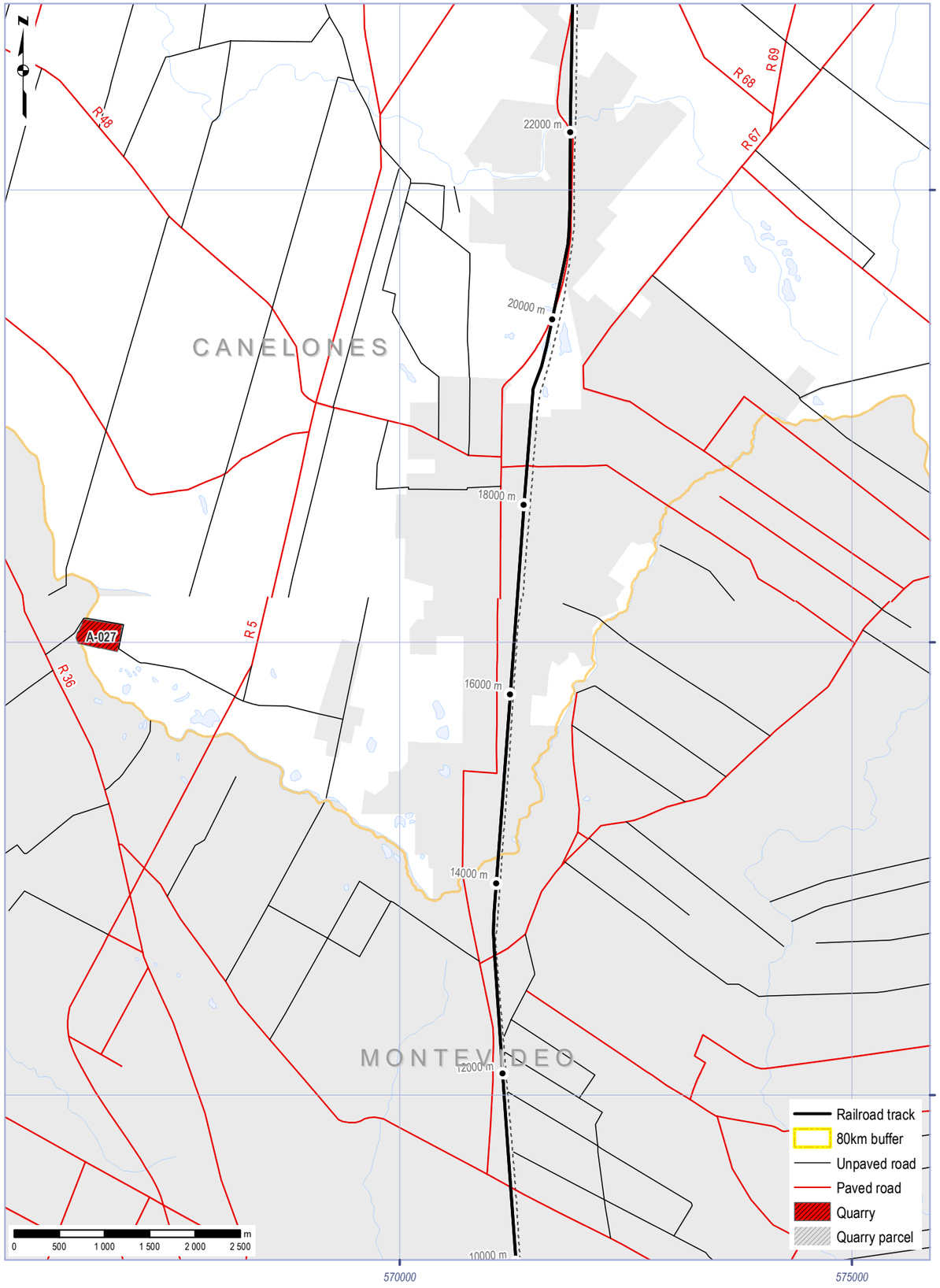

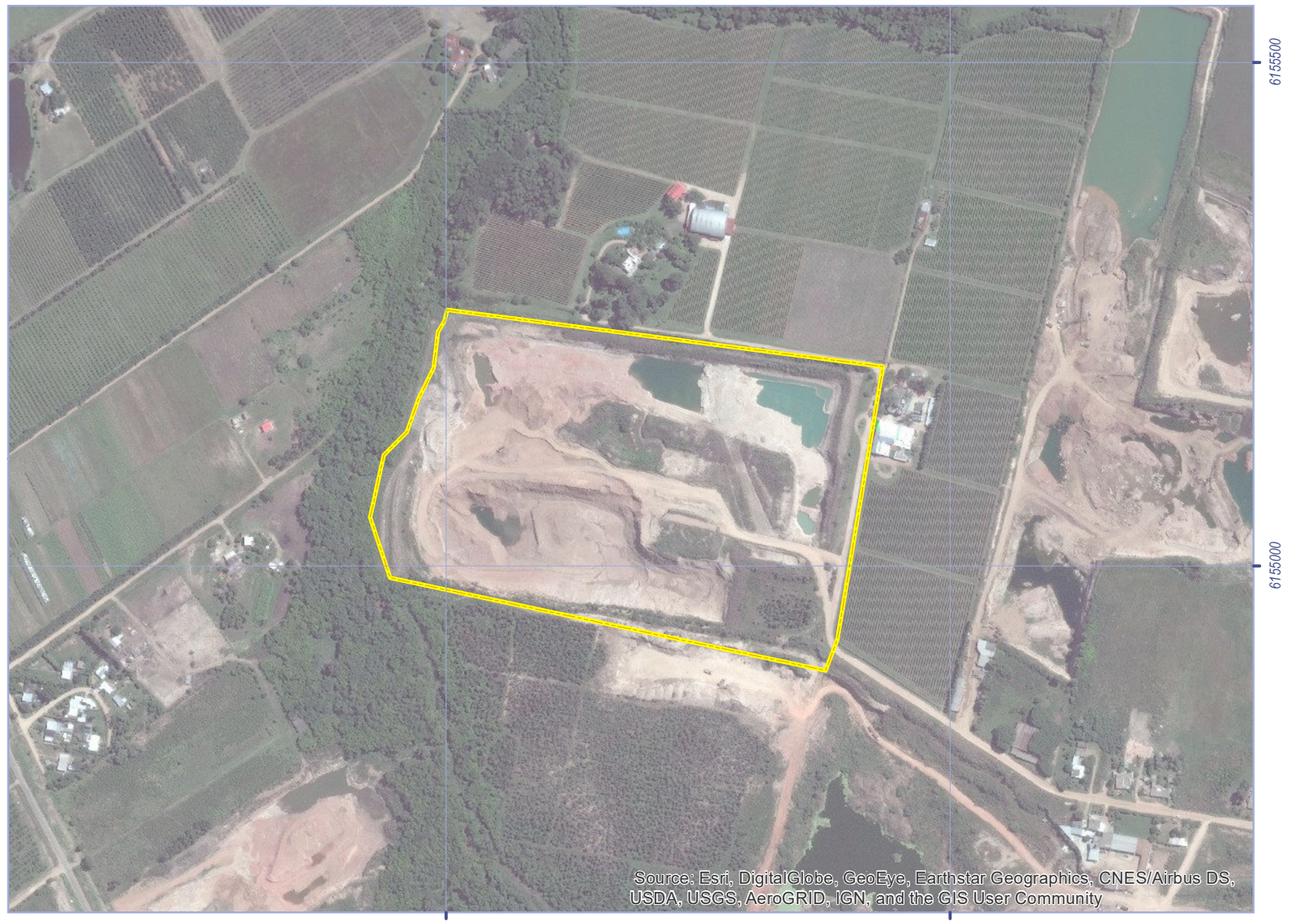

Quarry ID:	**A-027**	Closer railroad point:	**+18.4km**
Location (UTM):	**566680 - 6155070**	PAV road distance:	**5.9km + UPV**
Location (geographic):	**R5 & Fauquet Rd.**	UNPAV road distance:	**1.6km**
Parcel:	**41107 (5) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**120.300m2**		
MTOP File:	**Exp.2001/03/00509**		
Los Angeles test data:	**ND**		
Reserves:	**ND**		
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**		

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / A-027

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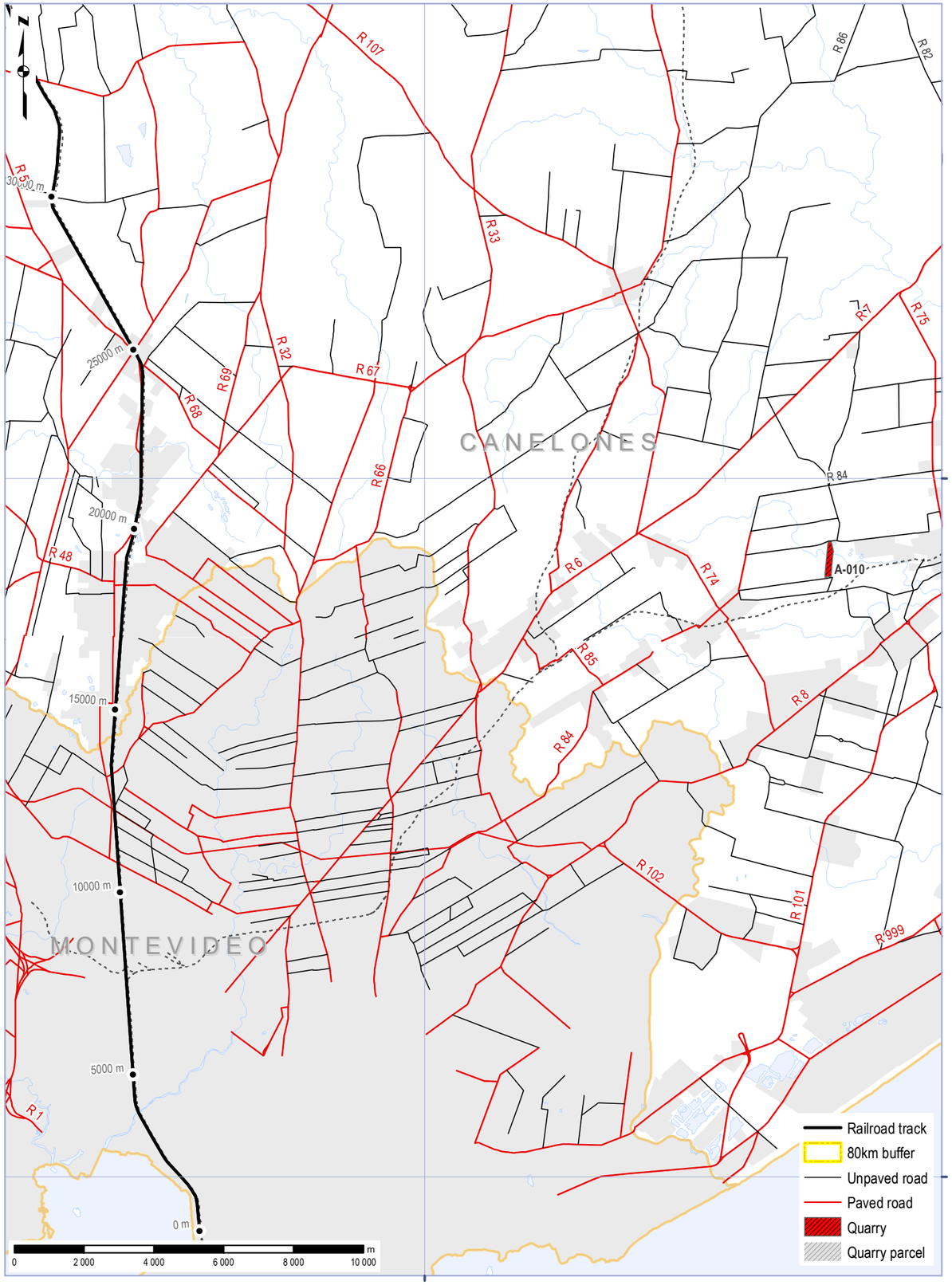

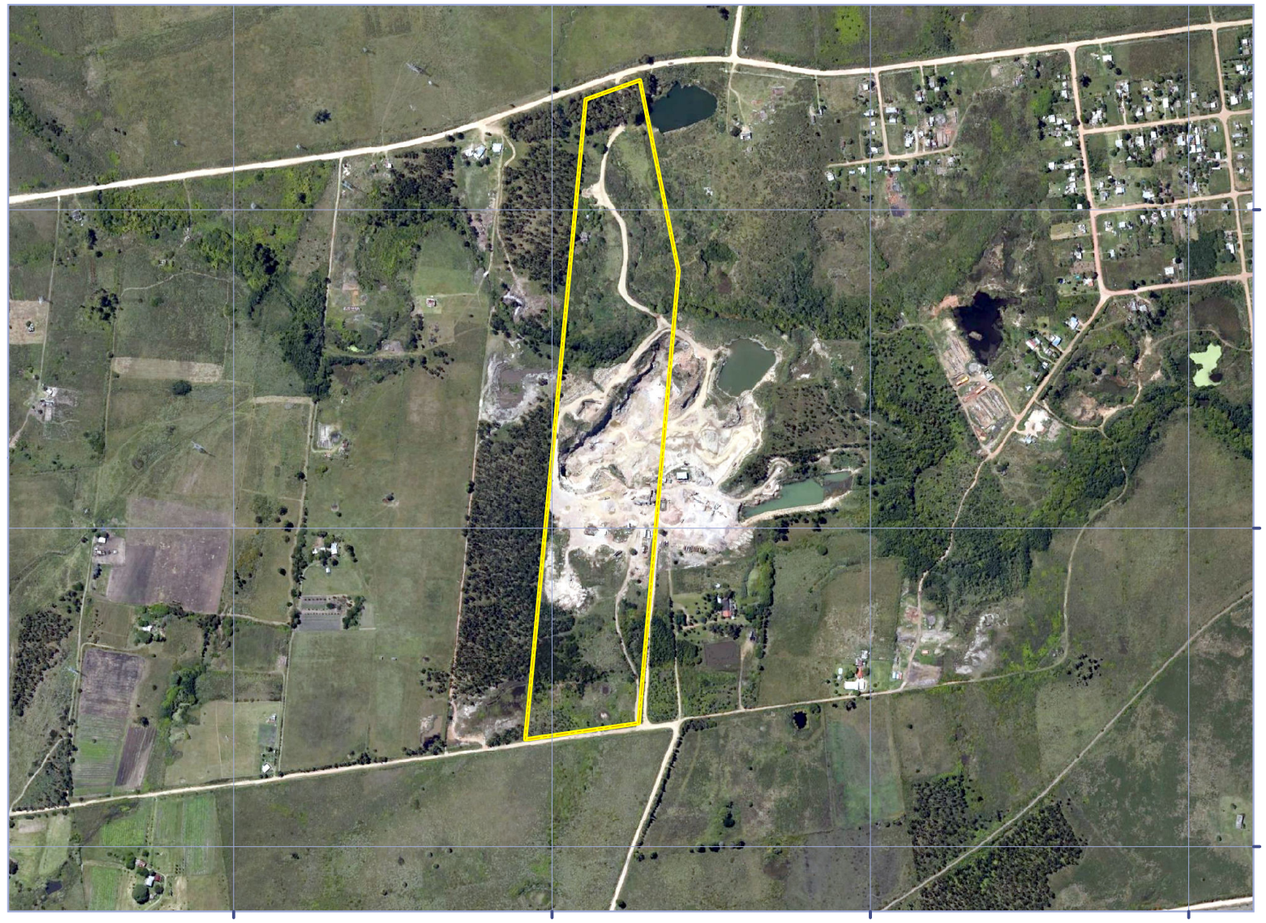

Quarry ID:	**A-010**	Closer railroad point:	**+12.4km**
Location (UTM):	**591600 - 6157610**	PAV road distance:	**26.6km + UPV**
Location (geographic):	**Suárez - Pando Rd.**	UNPAV road distance:	**3.1km**
Parcel:	**11065 (16) - Canelones**	RailRoad distance:	**-**
Lithology:	**Granite**		
Quarry area:	**15.000m2**		
MTOP File:	**Exp.2003/03/03305**		

Los Angeles test data:	**ND**
Reserves:	**± 100.000m3 bulk rock**
Permit issues:	**MTOP - Needs to change destination + Environmetal permits**

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

MTOP / A-010

CASS GEOLOGIA & MEDIO AMBIENTE

Sector 3

Rio Queguay Chico
Rio Queguay Grande
Rio Tacuarembó
R90
R25
R5
R013
R43
R012
R017
R3
R4
Q008
Rio Negro
R55
R14
Rio Brazo Del Rio Yi
Rio Yi

0 5 000 10 000 15 000 20 000 m

460000 480000 500000 520000 540000 560000 580000 600000 620000 640000

6440000 6420000 6400000 6380000 6360000 6340000

VF_MVD-PTO
Buffer_80km
Quarry
Basaltos (Fm. Arapey)
Sienitas (Fm. Sierra de Ánimas)
Granitos
Granodioritas/Tonalitas
Gneises graníticos

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

Geologic Availability

CASS GEOLOGIA & MEDIO AMBIENTE

Sector 2

N

Q007

N014

N001

Rio Negro

Rio Brazo Del Rio Yi

Rio Yi

Rio San José

Rio San Salvador

Rio San Juan

Rio Rosario

Rio Santa Lucia Chico

R3 R4 R5 R14 R55 R57 R23 R2 R12 R6 R7 R41

VF_MVD-PTO

Buffer_80km

Quarry

Basaltos (Fm. Arapey)

Sienitas (Fm. Sierra de Ánimas)

Granitos

Granodioritas/Tonalitas

Gneises graníticos

0 5 000 10 000 15 000 20 000 m

460000 480000 500000 520000 540000 560000 580000 600000 620000 640000

6340000 6320000 6300000 6280000 6260000 6240000

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

Geologic Availability

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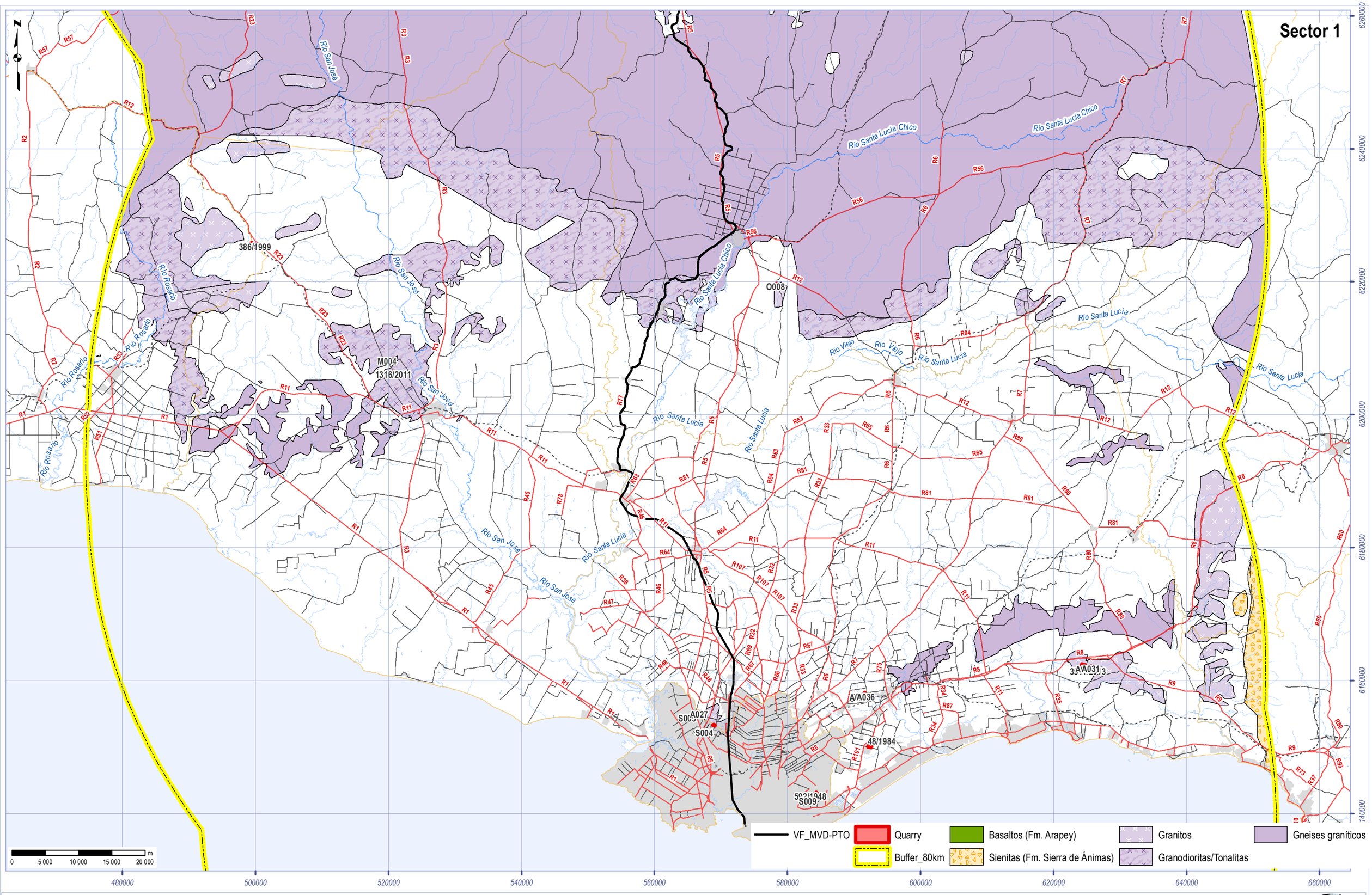

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Montevideo - Paso de los Toros Railroad Track

Ballast Rock Sources Locations

Geologic Availability

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