

ANEXO A
REPORTE DE PUNTOS
GEODÉSICOS

Network Adjustment Report

Report created: 21/09/2024 09:01:50

Project Details

General		Customer Details		Master Coordinate System	
Project Name:	proyecto de leo	Customer Name:	GEODAR	Coordinate System Name:	UTM20S
Owner:	universidad	Contact Person:	-	Transformation Type:	-
Lead Surveyor:	-	Number:	-	Residual Distribution:	None
Date Created:	19/09/2024 11:44:14	Email:	-	Ellipsoid:	WGS 1984
Last Accessed:	21/09/2024 08:59:54	Skype:	-	Projection Type:	UTM
Application Software:	Infinity 4.0.0	Website:	-	Geoid Model:	egm08_0S-90S_0W-180W_5x5
				CSCS Model:	-
Path:	C:\Users\Limbert\Documents\Leica Geosystems\Infinity\Projects\proyecto de leo\proyecto de leo.iprj				
Size:	24,3 MB				
Comments:	-				
Name:	09/21/2024 09:00:33				
Date/Time:	21/09/2024 09:00:34				
Processing kernel:	MOVE3 4.6.0				
	www.MOVE3.com				
	© 1993-2022 Sweco Nederland B.V.				
	Licensed to Leica Geosystems AG				

Adjustment Settings

General	
Controls:	Minimally Constrained
Dimension:	3D
Coordinate system:	WGS84
Height mode:	Ellipsoidal
Confidence Level for Heights - 1D:	68.3%
Confidence Level for Error Ellipses - 2D:	39.4%
Max. number of Iterations:	3
Iteration criteria:	0,0001 m
Standard Deviation Settings	
Source of Standard Deviation Settings - TPS:	
Slope Dist. (Absolute):	0,001 m
Slope Dist. (Relative):	1 PPM
Horizontal Angle:	0,00 gon
Vertical Angle:	0,00 gon
Source of Standard Deviation Settings - GNSS:	
Source of Standard Deviation Settings - Level:	
Source of Centring/Height Errors - TPS:	
Setup:	Default Settings for all Observations
	Target:

Centring Error:	0,001 m	0,001 m
Height Error:	0,001 m	0,001 m

Source of Centring/Height Errors - GNSS:

Individual

Testing Criteria

Level of Significance (α , multi-dimensional):	1,00
Level of Significance ($\alpha 0$, one-dimensional):	5,0%
Power of Test ($1-\beta$):	80%
σ a-priori:	1,0
σ a-priori (GNSS):	10,0

Advanced

Use reduced observations:	No
Use scale factor correction:	Ignore
Initial Scale Factor Correction:	0,0 PPM
Use vertical refraction coefficient:	Ignore
Initial Vertical Refraction Coefficient:	0,13

Adjustment Summary

Adjustment

Type:	Minimally Constrained
Dimension:	3D
Number of Iterations:	0
Max. coordinate correction in last iteration:	0,000 m

Stations

Number of (partly) known stations:	1
Number of unknown stations:	2
Total:	3

Observations

GNSS coordinate differences:	6 (2 baselines)
Known coordinates:	3
Total:	9

Unknowns

Coordinates:	9
Total:	9

Degrees of freedom: 0

Optimisation criterion $v'Pv$: 0,00000

σ a-posteriori: 0,000

Testing

Critical value W-Test:	1,96
Critical value T-Test (2 dimensional):	2,42
Critical value T-Test (3 dimensional):	1,89
Critical value F-Test:	0,00
F-Test:	0,00

Input data

Approximate Coordinates

Station	WGS84 Latitude	WGS84 Longitude	Ellip. Height [m]	Description
P-107	21° 30' 21,51123" S	64° 44' 26,31290" W	1.952,892	Control Fixed 3D
PV-01	21° 30' 56,90378" S	64° 45' 48,23584" W	2.009,072	Adjusted Least Squares 3D
PV-02	21° 27' 56,92848" S	64° 45' 47,74135" W	2.108,536	Adjusted Least Squares 3D

Observations

From Station	Target Point	ΔX [m]	ΔY [m]	ΔZ [m]	SD ΔX [m]	SD ΔY [m]	SD ΔZ [m]

P-107	PV-01	-2.281,273	-692,162	-1.033,650	0,002	0,004	0,002
P-107	PV-02	-1.364,038	-2.604,757	4.082,154	0,005	0,007	0,004

Adjustment Results

Adjusted Coordinates

Station	WGS84 Latitude	WGS84 Longitude	Ellip. Height [m]	Corr WGS84 Lat [m]	Corr WGS84 Long [m]	Corr Height [m]
P-107	21° 30' 21,51123" S	64° 44' 26,31290" W	1.952,892	0,000	0,000	0,000
PV-01	21° 30' 56,90378" S	64° 45' 48,23584" W	2.009,072	0,000	0,000	0,000
PV-02	21° 27' 56,92848" S	64° 45' 47,74135" W	2.108,536	0,000	0,000	0,000

Station	Easting [m]	Northing [m]	Ortho. Height [m]	Corr E [m]	Corr N [m]	Corr Height [m]
P-107	319.693,355	7.620.848,738	1.916,698	0,000	0,000	0,000
PV-01	317.347,850	7.619.733,800	1.972,643	0,000	0,000	0,000
PV-02	317.299,656	7.625.269,091	2.071,975	0,000	0,000	0,000

Standard Deviations

Station	SD WGS84 Lat [m]	SD WGS84 Long [m]	SD Height [m]
P-107	0,000	0,000	0,000
PV-01	0,002	0,002	0,004
PV-02	0,003	0,004	0,008

Absolute Error Ellipses (Confidence Levels: 2D - 39.4% 1D - 68.3%)

Station	Semi major (a) [m]	Semi minor (b) [m]	SD Height [m]	Orientation (φ) [°]
P-107	0,000	0,000	0,000	0
PV-01	0,002	0,002	0,004	83
PV-02	0,004	0,003	0,008	87

Relative Error Ellipses (Confidence Levels: 2D - 39.4% 1D - 68.3%)

From	To	Semi major (a) [m]	Semi minor (b) [m]	SD Height [m]	Orientation (ψ) [°]
P-107	PV-01	0,002	0,002	0,004	18
P-107	PV-02	0,004	0,003	0,008	-66

External Reliability

Station	Component	Ext. Rel. [m]	Observation Type	Station	Target
P-107	EW	0,000	DY of Baseline	P-107	PV-02
	NS	0,000	DZ of Baseline	P-107	PV-02
	Height	0,000	DY of Baseline	P-107	PV-01
PV-01	EW	-	-	-	-
	NS	-	-	-	-
	Height	-	-	-	-
PV-02	EW	-	-	-	-
	NS	-	-	-	-
	Height	-	-	-	-

Adjusted GNSS Observations

From Station	Target Point	ΔX [m]	ΔY [m]	ΔZ [m]	Res. ΔX [m]	Res. ΔY [m]	Res. ΔZ [m]
P-107	PV-01	-2.281,273	-692,162	-1.033,650	0,000	0,000	0,000
P-107	PV-02	-1.364,038	-2.604,757	4.082,154	0,000	0,000	0,000

Adjusted GNSS Observations - continued

From Station	Target Point	SD ΔX [m]	SD ΔY [m]	SD ΔZ [m]	W-Test ΔX	W-Test ΔY	W-Test ΔZ	T-Test
P-107	PV-01	0,002	0,004	0,002	-	-	-	-
P-107	PV-02	0,005	0,007	0,004	-	-	-	-

GNSS Baseline Vector Residuals

From Station	Target Point	Adj. Vector	Resid [m]	Resid [ppm]
P-107	PV-01	2.598,409	0,000	0,0
P-107	PV-02	5.030,839	0,000	0,0

Testing and Estimated Errors

Coordinate Tests

--	--	--	--	--	--	--	--

Station		MDB	Redundancy	BNR	W-Test	Est Error	T-Test
P-107	WGS84 Latitude	-	-	-	-	-	-
	WGS84 Longitude	-	-	-	-	-	
	Height	-	-	-	-	-	

Observation Tests

	Station	Target	MDB	Redundancy	BNR	W-Test	Est Error	T-Test
ΔX	P-107	PV-01	-	-	-	-	-	-
ΔY			-	-	-	-	-	-
ΔZ			-	-	-	-	-	-
ΔX	P-107	PV-02	-	-	-	-	-	-
ΔY			-	-	-	-	-	-
ΔZ			-	-	-	-	-	-

Antenna Height Tests

Station	Target	Date/Time	Antenna MDB	Antenna W-Test	Est. Antenna Error
P-107	PV-01	09/09/2024 16:04:37	0,000 m	0,00	-
P-107	PV-02	09/09/2024 17:41:17	0,000 m	0,00	-

Network Adjustment Report

Report created: 21/09/2024 08:57:34

Project Details

General		Customer Details		Master Coordinate System	
Project Name:	PV-4 Y PV-3 TRABAJO DE LEO	Customer Name:	GEODAR	Coordinate System Name:	UTM20S
Owner:	UNIVERSIDAD	Contact Person:	-	Transformation Type:	-
Lead Surveyor:	-	Number:	-	Residual Distribution:	None
Date Created:	21/09/2024 07:19:55	Email:	-	Ellipsoid:	WGS 1984
Last Accessed:	21/09/2024 07:49:53	Skype:	-	Projection Type:	UTM
Application Software:	Infinity 4.0.0	Website:	-	Geoid Model:	egm08_0S-90S_0W-180W_5x5
				CSCS Model:	-
Path:	C:\Users\Limbert\Documents\Leica Geosystems\Infinity\Projects\PV-4 Y PV-3 TRABAJO DE LEO\PV-4 Y PV-3 TRABAJO DE LEO.iprj				
Size:	39,5 MB				
Comments:	-				
Name:	09/21/2024 08:57:09				
Date/Time:	21/09/2024 08:57:09				
Processing kernel:	MOVE3 4.6.0				
	www.MOVE3.com				
	© 1993-2022 Sweco Nederland B.V.				
	Licensed to Leica Geosystems AG				

Adjustment Settings

General	
Controls:	Minimally Constrained
Dimension:	3D
Coordinate system:	WGS84
Height mode:	Ellipsoidal
Confidence Level for Heights - 1D:	68.3%
Confidence Level for Error Ellipses - 2D:	39.4%
Max. number of Iterations:	3
Iteration criteria:	0,0001 m
Standard Deviation Settings	
Source of Standard Deviation Settings - TPS:	
Slope Dist. (Absolute):	0,001 m
Slope Dist. (Relative):	1 PPM
Horizontal Angle:	0,00010 gon
Vertical Angle:	0,00010 gon
Source of Standard Deviation Settings - GNSS:	
Source of Standard Deviation Settings - Level:	
Source of Centring/Height Errors - TPS:	
Setup:	Target:
Use Defaults	
Individual	
Individual	
Default Settings for all Observations	

Centring Error:	0,001 m	0,001 m
Height Error:	0,001 m	0,001 m

Source of Centring/Height Errors - GNSS:

Individual

Testing Criteria

Level of Significance (α , multi-dimensional):	1,00
Level of Significance ($\alpha 0$, one-dimensional):	5,0%
Power of Test ($1-\beta$):	80%
σ a-priori:	1,0
σ a-priori (GNSS):	10,0

Advanced

Use reduced observations:	No
Use scale factor correction:	Ignore
Initial Scale Factor Correction:	0,0 PPM
Use vertical refraction coefficient:	Ignore
Initial Vertical Refraction Coefficient:	0,13

Adjustment Summary

Adjustment

Type:	Minimally Constrained
Dimension:	3D
Number of Iterations:	0
Max. coordinate correction in last iteration:	0,000 m

Stations

Number of (partly) known stations:	1
Number of unknown stations:	2
Total:	3

Observations

GNSS coordinate differences:	6 (2 baselines)
Known coordinates:	3
Total:	9

Unknowns

Coordinates:	9
Total:	9

Degrees of freedom: 0

Optimisation criterion $v'Pv$: 0,00000

σ a-posteriori: 0,000

Testing

Critical value W-Test:	1,96
Critical value T-Test (2 dimensional):	2,42
Critical value T-Test (3 dimensional):	1,89
Critical value F-Test:	0,00
F-Test:	0,00

Input data

Approximate Coordinates

Station	WGS84 Latitude	WGS84 Longitude	Ellip. Height [m]	Description
6991	21° 30' 21,51123" S	64° 44' 26,31290" W	1.952,892	Control Fixed 3D
PV-3	21° 32' 08,02095" S	64° 59' 41,35775" W	3.607,812	Adjusted Least Squares 3D
PV-4	21° 37' 47,61000" S	64° 51' 36,03749" W	2.180,896	Adjusted Least Squares 3D

Observations

From Station	Target Point	ΔX [m]	ΔY [m]	ΔZ [m]	SD ΔX [m]	SD ΔY [m]	SD ΔZ [m]

6991	PV-3	-23.708,387	-11.494,678	-3.655,925	0,005	0,007	0,004
6991	PV-4	-13.248,094	-892,276	-12.847,860	0,008	0,014	0,007

Adjustment Results

Adjusted Coordinates

Station	WGS84 Latitude	WGS84 Longitude	Ellip. Height [m]	Corr WGS84 Lat [m]	Corr WGS84 Long [m]	Corr Height [m]
6991	21° 30' 21,51123" S	64° 44' 26,31290" W	1.952,892	0,000	0,000	0,000
PV-3	21° 32' 08,02095" S	64° 59' 41,35775" W	3.607,812	0,000	0,000	0,000
PV-4	21° 37' 47,61000" S	64° 51' 36,03749" W	2.180,896	0,000	0,000	0,000

Station	Easting [m]	Northing [m]	Ortho. Height [m]	Corr E [m]	Corr N [m]	Corr Height [m]
6991	319.693,355	7.620.848,738	1.916,698	0,000	0,000	0,000
PV-3	293.398,413	7.617.257,858	3.568,459	0,000	0,000	0,000
PV-4	307.489,173	7.606.985,827	2.143,572	0,000	0,000	0,000

Standard Deviations

Station	SD WGS84 Lat [m]	SD WGS84 Long [m]	SD Height [m]
6991	0,000	0,000	0,000
PV-3	0,003	0,003	0,009
PV-4	0,005	0,006	0,016

Absolute Error Ellipses (Confidence Levels: 2D - 39.4% 1D - 68.3%)

Station	Semi major (a) [m]	Semi minor (b) [m]	SD Height [m]	Orientation (φ) [°]
6991	0,000	0,000	0,000	45
PV-3	0,003	0,003	0,009	87
PV-4	0,006	0,005	0,016	-80

Relative Error Ellipses (Confidence Levels: 2D - 39.4% 1D - 68.3%)

From	To	Semi major (a) [m]	Semi minor (b) [m]	SD Height [m]	Orientation (ψ) [°]
6991	PV-3	0,003	0,003	0,009	4
6991	PV-4	0,006	0,005	0,016	58

External Reliability

Station	Component	Ext. Rel. [m]	Observation Type	Station	Target
6991	EW	0,000	DX of Baseline	6991	PV-4
	NS	0,000	DZ of Baseline	6991	PV-3
	Height	0,000	DY of Baseline	6991	PV-4
PV-3	EW	-	-	-	-
	NS	-	-	-	-
	Height	-	-	-	-
PV-4	EW	-	-	-	-
	NS	-	-	-	-
	Height	-	-	-	-

Adjusted GNSS Observations

From Station	Target Point	ΔX [m]	ΔY [m]	ΔZ [m]	Res. ΔX [m]	Res. ΔY [m]	Res. ΔZ [m]
6991	PV-3	-23.708,387	-11.494,678	-3.655,925	0,000	0,000	0,000
6991	PV-4	-13.248,094	-892,276	-12.847,860	0,000	0,000	0,000

Adjusted GNSS Observations - continued

From Station	Target Point	SD ΔX [m]	SD ΔY [m]	SD ΔZ [m]	W-Test ΔX	W-Test ΔY	W-Test ΔZ	T-Test
6991	PV-3	0,005	0,007	0,004	-	-	-	-
6991	PV-4	0,008	0,014	0,007	-	-	-	-

GNSS Baseline Vector Residuals

From Station	Target Point	Adj. Vector	Resid [m]	Resid [ppm]
6991	PV-3	26.600,395	0,000	0,0
6991	PV-4	18.476,354	0,000	0,0

Testing and Estimated Errors

Coordinate Tests

--	--	--	--	--	--	--	--

Station		MDB	Redundancy	BNR	W-Test	Est Error	T-Test
6991	WGS84 Latitude	-	-	-	-	-	-
	WGS84 Longitude	-	-	-	-	-	
	Height	-	-	-	-	-	

Observation Tests

	Station	Target	MDB	Redundancy	BNR	W-Test	Est Error	T-Test
ΔX	6991	PV-3	-	-	-	-	-	-
ΔY			-	-	-	-	-	-
ΔZ			-	-	-	-	-	-
ΔX	6991	PV-4	-	-	-	-	-	-
ΔY			-	-	-	-	-	-
ΔZ			-	-	-	-	-	-

Antenna Height Tests

Station	Target	Date/Time	Antenna MDB	Antenna W-Test	Est. Antenna Error
6991	PV-3	10/09/2024 08:32:07	0,000 m	0,00	-
6991	PV-4	10/09/2024 12:31:47	0,000 m	0,00	-



MARGEN - ROC

MARCO DE REFERENCIA GEODÉSICO NACIONAL
MARGEN - SIRGAS (ESTACIONES ACTIVAS)
RED DE OPERACIONES CONTINUAS (ROC)

TRJA

1. FORMULARIO.-

ELABORADO POR:	INSTITUTO GEOGRÁFICO MILITAR - DEPARTAMENTO III OPERACIONES CENTRO DE PROCESAMIENTO Y ANALISIS GNSS - BOLIVIA (CEPAG)
EMPLEADO PARA:	

2. MONOGRAFIA DEL PUNTO.-



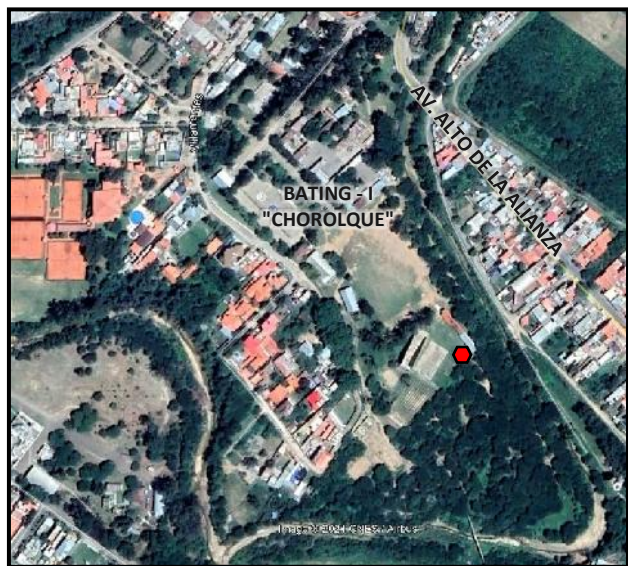
2.1 INFORMACIÓN DE LA ESTACIÓN GPS.-

CÓDIGO INTERNACIONAL	TRJA
SISTEMA DE REFERENCIA	WGS-84
MARCO DE REFERENCIA	MARGEN - SIRGAS
REFERIDA A	RED SIRGAS

2.2 INFORMACIÓN DEL EQUIPO GPS.-

2.2.1 RECEPTOR		2.2.2 ANTENA	
TIPO	TRIMBLE	TIPO	TRIMBLE
N° SERIE	4507245483		TRM41249.00
MODELO	NetRS	N° SERIE	2612187135
CÓDIGO	TRM 41249	MODELO	ZEPHYR GEODETIC

PARA EFECTOS DE POST PROCESO UTILIZAR
ALTURA ANTENA = 0



2.3 LOCALIZACIÓN.-

DEPARTAMENTO	TARIJA
PROVINCIA	CERCADO
CIUDAD	TARIJA
LUGAR	INSTALACIONES DEL BATING - I "CHOROLQUE"

2.4 COORDENADAS.-

COORDENADAS GEOGRÁFICAS						
ITRF 2005 - DATUM - EPOCA MARZO - 10						
COORDENADAS GEOGRÁFICAS				COORDENADAS CARTESIANAS		DESV. ESTANDAR
LATITUD	21°	32'	58.137910"	X	2535567.343	0.000
LONGITUD	64°	42'	59.469809"	Y	-5368039.421	0.000
ALT. ELIP.	1887.179 m.			Z	-2328780.938	0.000
ALT. GEOM.	1848.1512 m.s.n.m.					

3. INFORMACIÓN ADICIONAL.-

DIRECCIÓN :	Estado Mayor General, Avenida Saavedra Nro. 2303 - Ciudad de La Paz - Bolivia		
TELEFONO :	2228329	FAX :	2228329
EMAIL :	www.igmbolivia.gob.bo , cepagigm@gmail.com		

ANEXOS B. Memoria fotográfica

Imágenes de inspección de las coberturas vegetal que existen en la cuenca del río victoria.



Imágenes de la construcción de los mojones de los puntos geodésicos.



Imágenes de la toma de datos con los equipos.





ANEXOS C. Tablas de cálculos de coeficiente de escorrentía

Tabla de coeficiente de escorrentía

Código	Cobertura vegetal	Código	Pendiente del terreno					Código
			1	2	3	4	5	
		Tipo de suelo	>50%	50-20%	20-5%	5-1%	<1%	
100	Sin vegetación	impermeable	0.80	0.75	0.70	0.65	0.60	10
100		semipermeable	0.70	0.65	0.60	0.55	0.50	20
100		permeable	0.50	0.45	0.40	0.35	0.30	30
200	cultivos	impermeable	0.70	0.65	0.60	0.55	0.50	10
200		semipermeable	0.60	0.55	0.50	0.45	0.40	20
200		permeable	0.40	0.35	0.30	0.25	0.20	30
300	Vegetación ligera	impermeable	0.65	0.60	0.55	0.50	0.45	10
300		semipermeable	0.55	0.50	0.45	0.40	0.35	20
300		permeable	0.35	0.30	0.25	0.20	0.15	30
400	hierva	impermeable	0.60	0.55	0.50	0.45	0.40	10
400		semipermeable	0.50	0.45	0.40	0.35	0.30	20
400		permeable	0.30	0.25	0.20	0.15	0.10	30
500	Vegetación densa	impermeable	0.55	0.50	0.45	0.40	0.35	10
500		semipermeable	0.45	0.40	0.35	0.30	0.25	20
500		permeable	0.25	0.20	0.15	0.10	0.05	30

Tabla de cobertura vegetal 2000

Código	Área m	Coef. C	C*Área
11	8100.0	-	-
12	6519.9	-	-
13	74064.2	-	-
14	1015913.0	-	-
15	3043977.2	-	-
23	225.0	-	-
24	4870.4	-	-
25	6884.0	-	-
111	18605.6	0.80	14884.5
112	239057.3	0.75	179293.0

113	1435397.0	0.70	1004777.9
114	7666136.0	0.65	4982988.4
115	9069192.5	0.60	5441515.5
121	253760.7	0.70	177632.5
122	2409629.0	0.65	1566258.9
123	1790444.0	0.60	1074266.4
124	81355.0	0.55	44745.2
125	675.0	0.50	337.5
211	5510.1	0.70	3857.1
212	56944.4	0.65	37013.9
213	146924.5	0.60	88154.7
214	69564.3	0.55	38260.4
215	23654.6	0.50	11827.3
221	18726.3	0.60	11235.8
222	190702.4	0.55	104886.3
223	220939.0	0.50	110469.5
224	3981.6	0.45	1791.7
311	25353.6	0.65	16479.8
312	303246.1	0.60	181947.7
313	1158574.0	0.55	637215.7
314	4925857.5	0.50	2462928.8
315	7839657.9	0.45	3527846.1
321	10057.4	0.55	5531.6
322	126066.6	0.50	63033.3
323	236069.4	0.45	106231.2
324	10315.7	0.40	4126.3
411	17032.1	0.60	10219.3
412	146510.1	0.55	80580.6
413	953787.7	0.50	476893.8
414	2012020.7	0.45	905409.3
415	1544378.7	0.40	617751.5
421	9417.5	0.50	4708.7
422	129877.8	0.45	58445.0
423	402501.2	0.40	161000.5
424	64134.3	0.35	22447.0
425	307.2	0.30	92.2
511	22053.2	0.55	12129.2
512	50140.9	0.50	25070.4
513	639536.2	0.45	287791.3
514	4732786.7	0.40	1893114.7
515	6491823.1	0.35	2272138.1
521	3690.5	0.45	1660.7
522	91446.2	0.40	36578.5

523	598229.6	0.35	209380.4
524	190106.4	0.30	57031.9
525	24521.7	0.25	6130.4
	60621253.0		29038110.3
		Coef. C _{pond}	0.51431

Tabla de cobertura vegetal 2005

Código	Área m	Coef. C	C*Área
11	8550.0		
12	7940.6		
13	78895.7		
14	1201041.8		
15	3626806.4		
24	5021.2		
25	9645.1		
111	9921.5	0.80	7937.2
112	184694.7	0.75	138521.1
113	1318930.4	0.70	923251.3
114	9867117.6	0.65	6413626.4
115	13100689.0	0.60	7860413.4
121	221098.6	0.70	154769.0
122	2070203.8	0.65	1345632.5
123	1447191.7	0.60	868315.0
124	37760.0	0.55	20768.0
125	2963.7	0.50	1481.8
211	5319.1	0.70	3723.4
212	40652.4	0.65	26424.1
213	87349.8	0.60	52409.9
214	69506.9	0.55	38228.8
215	11692.8	0.50	5846.4
221	15776.3	0.60	9465.8
222	199850.5	0.55	109917.7
223	218775.8	0.50	109387.9
224	13608.8	0.45	6124.0
311	28299.4	0.65	18394.6
312	298840.8	0.60	179304.5
313	925239.8	0.55	508881.9
314	3541154.2	0.50	1770577.1
315	5714980.9	0.45	2571741.4
321	35163.4	0.55	19339.9
322	333982.8	0.50	166991.4
323	327098.6	0.45	147194.4

324	10927.1	0.40	4370.8
411	21101.8	0.60	12661.1
412	195051.4	0.55	107278.3
413	1218887.6	0.50	609443.8
414	2348027.2	0.45	1056612.2
415	1464512.4	0.40	585805.0
421	23029.1	0.50	11514.5
422	238627.0	0.45	107382.2
423	642757.7	0.40	257103.1
424	92501.6	0.35	32375.5
425	8511.3	0.30	2553.4
511	24138.5	0.55	13276.2
512	73874.9	0.50	36937.4
513	762915.6	0.45	343312.0
514	3380089.9	0.40	1352036.0
515	4123474.7	0.35	1443216.1
521	5133.1	0.45	2309.9
522	94913.8	0.40	37965.5
523	620152.3	0.35	217053.3
524	193234.7	0.30	57970.4
525	12150.3	0.25	3037.6
60619776.0			29772883.1
Coef. Cpond			0.53470

Tabla de cobertura vegetal 2010

Código	Área m	Coef. C	C*Área
11	9077.3	-	-
12	8236.5	-	-
13	82055.3	-	-
14	1162190.8	-	-
15	3430265.5	-	-
24	6370.3	-	-
25	9220.6	-	-
111	18661.1	0.80	14928.8
112	289453.0	0.75	217089.8
113	1343675.9	0.70	940573.1
114	7019456.2	0.65	4562646.5
115	8628258.6	0.60	5176955.2
121	217489.8	0.70	152242.8
122	2150488.2	0.65	1397817.4
123	1512557.6	0.60	907534.5
124	50334.0	0.55	27683.7

125	323.9	0.50	162.0
211	3651.4	0.70	2556.0
212	37993.6	0.65	24695.9
213	215814.1	0.60	129488.5
214	598789.1	0.55	329334.0
215	547807.3	0.50	273903.7
221	38055.4	0.60	22833.2
222	301047.7	0.55	165576.2
223	333880.3	0.50	166940.1
224	8728.8	0.45	3928.0
311	20831.2	0.65	13540.3
312	215596.3	0.60	129357.8
313	830864.9	0.55	456975.7
314	4243860.7	0.50	2121930.4
315	6900196.3	0.45	3105088.3
321	5834.9	0.55	3209.2
322	89558.1	0.50	44779.1
323	108567.7	0.45	48855.4
324	3902.3	0.40	1560.9
411	18252.8	0.60	10951.7
412	157504.4	0.55	86627.4
413	1049398.0	0.50	524699.0
414	3231679.7	0.45	1454255.8
415	3239986.3	0.40	1295994.5
421	27157.6	0.50	13578.8
422	265455.2	0.45	119454.8
423	630630.9	0.40	252252.4
424	89897.4	0.35	31464.1
425	8727.2	0.30	2618.1
511	26272.1	0.55	14449.7
512	93540.2	0.50	46770.1
513	886718.9	0.45	399023.5
514	4174137.7	0.40	1669655.1
515	5258722.6	0.35	1840552.9
521	8885.5	0.45	3998.5
522	134283.2	0.40	53713.3
523	666500.0	0.35	233275.0
524	195877.0	0.30	58763.1
525	14170.6	0.25	3542.7
60620892.0			28557826.9
Coef. C _{pond}			0.51075

Tabla de cobertura vegetal 2015

Código	Área m	Coef. C	C*Área
11	6113.7	-	-
12	4922.0	-	-
13	62143.3	-	-
14	981783.5	-	-
15	3095605.9	-	-
24	5493.2	-	-
25	8565.3	-	-
111	11348.1	0.80	9078.5
112	196518.2	0.75	147388.6
113	1204034.0	0.70	842823.8
114	7769303.2	0.65	5050047.1
115	9997437.6	0.60	5998462.6
121	197811.4	0.70	138468.0
122	1870531.9	0.65	1215845.7
123	1283852.8	0.60	770311.7
124	30341.1	0.55	16687.6
211	15319.7	0.70	10723.8
212	88044.4	0.65	57228.9
213	281093.9	0.60	168656.3
214	308512.7	0.55	169682.0
215	131189.1	0.50	65594.5
221	36200.3	0.60	21720.2
222	334203.2	0.55	183811.7
223	436652.7	0.50	218326.4
224	29058.3	0.45	13076.2
225	261.5	0.40	104.6
311	31453.5	0.65	20444.8
312	332353.1	0.60	199411.9
313	1186167.2	0.55	652392.0
314	4496320.5	0.50	2248160.3
315	7153577.2	0.45	3219109.7
321	34628.6	0.55	19045.7
322	334343.6	0.50	167171.8
323	393051.6	0.45	176873.2
324	28490.5	0.40	11396.2
411	13119.1	0.60	7871.5
412	125314.1	0.55	68922.8
413	1039639.4	0.50	519819.7
414	4068118.2	0.45	1830653.2
415	4599703.2	0.40	1839881.3

421	28483.5	0.50	14241.8
422	345006.4	0.45	155252.9
423	686694.4	0.40	274677.8
424	90504.0	0.35	31676.4
425	144.1	0.30	43.2
511	19934.7	0.55	10964.1
512	57112.0	0.50	28556.0
513	623717.2	0.45	280672.8
514	2787905.1	0.40	1115162.0
515	3052561.7	0.35	1068396.6
521	1583.0	0.45	712.4
522	56354.1	0.40	22541.6
523	452641.1	0.35	158424.4
524	172013.4	0.30	51604.0
525	23401.4	0.25	5850.3
60620676.8			29297968.4
		Coef. C _{pond}	0.51895

Tabla de cobertura vegetal 2020

Código	Área m	Coef. C	C*Área
11	8286.3	-	-
12	6067.4	-	-
13	65741.0	-	-
14	850773.6	-	-
15	2784209.5	-	-
24	3785.5	-	-
25	8557.7	-	-
111	9596.3	0.80	7677.1
112	149497.4	0.75	112123.0
113	1121855.1	0.70	785298.5
114	7691824.9	0.65	4999686.2
115	9677641.1	0.60	5806584.7
121	181706.4	0.70	127194.5
122	1595630.5	0.65	1037159.8
123	1194207.4	0.60	716524.5
124	50668.7	0.55	27867.8
125	450.0	0.50	225.0
211	6239.1	0.70	4367.4
212	40052.5	0.65	26034.1
213	145470.9	0.60	87282.6
214	230005.1	0.55	126502.8

215	119103.6	0.50	59551.8
221	13525.4	0.60	8115.2
222	128132.3	0.55	70472.8
223	140722.6	0.50	70361.3
224	6315.0	0.45	2841.8
311	34175.6	0.65	22214.2
312	394919.8	0.60	236951.9
313	1362323.6	0.55	749278.0
314	4516175.3	0.50	2258087.6
315	6833562.8	0.45	3075103.3
321	84762.2	0.55	46619.2
322	892186.7	0.50	446093.3
323	789537.6	0.45	355291.9
324	25600.4	0.40	10240.1
411	14501.5	0.60	8700.9
412	150599.6	0.55	82829.8
413	1177291.6	0.50	588645.8
414	3740715.2	0.45	1683321.8
415	4122901.5	0.40	1649160.6
421	19794.6	0.50	9897.3
422	281984.4	0.45	126893.0
423	773522.9	0.40	309409.2
424	130297.8	0.35	45604.2
425	450.0	0.30	135.0
511	23671.7	0.55	13019.4
512	62070.2	0.50	31035.1
513	532438.5	0.45	239597.3
514	3387737.0	0.40	1355094.8
515	4482489.0	0.35	1568871.1
521	1143.0	0.45	514.3
522	44878.6	0.40	17951.4
523	347914.7	0.35	121770.1
524	140753.3	0.30	42226.0
525	23641.7	0.25	5910.4
60622106.2			29176338.1
Coef. C _{pond}			0.51281

Tabla de cobertura vegetal 2024

Código	Área m	Coef. C	C*Área
11	8248.5	-	-
12	7273.3	-	-
13	66690.2	-	-

14	838903.0	-	-
15	2727926.7	-	-
24	4237.0	-	-
25	8540.4	-	-
111	12967.7	0.80	10374.1
112	212575.8	0.75	159431.8
113	1090259.5	0.70	763181.6
114	7029914.5	0.65	4569444.4
115	8916085.6	0.60	5349651.3
121	184725.1	0.70	129307.6
122	1698099.0	0.65	1103764.3
123	1255616.9	0.60	753370.1
124	32261.8	0.55	17744.0
211	5397.8	0.70	3778.5
212	37573.4	0.65	24422.7
213	101319.9	0.60	60791.9
214	146140.7	0.55	80377.4
215	102836.1	0.50	51418.0
221	7824.6	0.60	4694.8
222	70490.8	0.55	38770.0
223	110582.7	0.50	55291.3
224	3972.7	0.45	1787.7
311	25312.6	0.65	16453.2
312	280495.2	0.60	168297.1
313	1011788.2	0.55	556483.5
314	4002446.6	0.50	2001223.3
315	6401592.7	0.45	2880716.7
321	71152.4	0.55	39133.8
322	636247.5	0.50	318123.7
323	509250.9	0.45	229162.9
324	19577.2	0.40	7830.9
325	225.0	0.35	78.8
411	21850.7	0.60	13110.4
412	206355.8	0.55	113495.7
413	1575548.0	0.50	787774.0
414	5234600.5	0.45	2355570.2
415	5758739.5	0.40	2303495.8
421	36272.4	0.50	18136.2
422	483846.2	0.45	217730.8
423	988459.9	0.40	395384.0
424	131815.4	0.35	46135.4
425	675.0	0.30	202.5
511	23563.5	0.55	12959.9

512	58946.7	0.50	29473.4
513	561794.3	0.45	252807.4
514	3181282.5	0.40	1272513.0
515	4095589.2	0.35	1433456.2
521	3214.3	0.45	1446.4
522	44274.3	0.40	17709.7
523	389743.4	0.35	136410.2
524	163949.9	0.30	49185.0
525	23263.8	0.25	5816.0
	60622336.9		28857917.7
		Coef. C _{pond}	0.50663