

**INGENIERÍA TÉCNICA EN TOPOGRAFÍA**  
**PROYECTO FINAL DE CARRERA**

**PROPUESTA DE MEJORA DEL ACCESO**  
**A LA CARRETERA BV-2003**  
**ENTRE VILADECANS Y SANT CLIMENT**

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## 1. Datos de la estación (datos crudos)

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240	1287.6563102387	2378.3463101444	93.1889166926	272	1174.3323072732	2509.6152849924	87.1536110374
241	1291.7616703244	2396.1892273937	92.8839823849	273	1178.5317197224	2508.6917166550	87.1721385326
242	1273.3366100758	2387.1964696502	92.5747311469	274	1164.8346101310	2515.8799078445	86.0205948834
243	1266.9543691478	2366.1090126097	92.9173876620	275	1165.4614141123	2521.6000794535	85.2030292599
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293	1079.4255981816	2625.2626052457	84.5956452660	322	1012.4821618087	2732.7553255890	75.7347328840
294	1048.1831417527	2626.2257121573	84.8674257127	323	1002.5958578401	2738.1967099285	75.6441321811
295	1055.7434729944	2634.9733198991	84.6065663307	E18	995.5699631941	2742.5310003931	75.6482916357
296	1097.3416212087	2629.6540164869	83.5478076241	E19	922.7256285043	2795.9329993639	75.3943939879
297	1092.1152383253	2636.1308757043	83.1746934619	324	1019.2058205055	2725.1028956671	75.9147838380
298	1090.2465150506	2637.0524250096	83.8908099127	325	1012.1579413901	2729.2816991704	75.9185558248
299	1106.3263160854	2643.1303923239	81.8592018023	326	999.7644327970	2736.5372356424	75.7901943700
300	1095.7475847002	2651.7106159309	81.8716952019	327	1015.0565911142	2726.1888060983	77.5152229645
E16	1094.4397150035	2655.2976627279	81.5278825936	328	998.5039747551	2732.9325691349	78.9955058110
301	1090.0738440918	2653.8732601316	81.6278608500	329	982.1814173800	2746.4297896915	76.9833975754
302	1086.2294901619	2654.1233010101	83.1326434866	330	985.9832012039	2745.5057482128	75.6957275470
303	1075.3763897888	2655.9968610443	83.1049231552	331	987.8147538765	2748.3479326144	75.6376295542
304	1095.1006398089	2660.6428331436	81.0090928628	332	980.7955459668	2751.3919106875	75.6044054006
305	1082.0152121871	2663.8040931482	80.4361511331	E20	870.2779047270	2841.5574323655	75.1772618847

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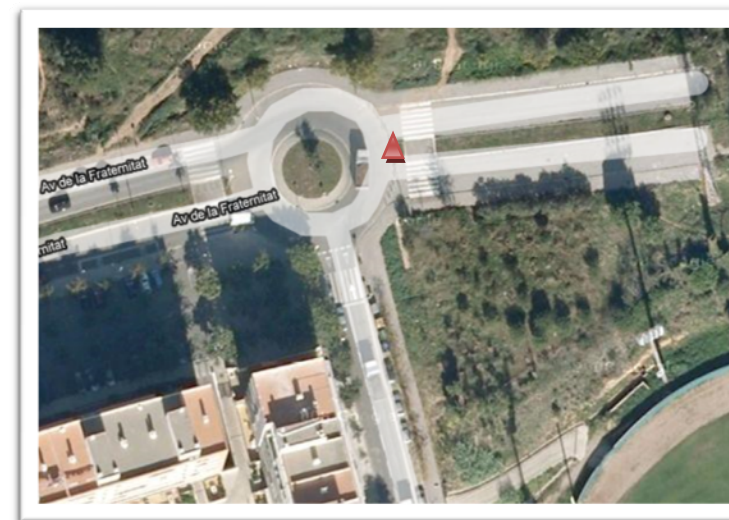
333	946.0766615799	2777.4232458227	75.5946271842	365	897.7688614523	2826.7371669873	75.7578969556
334	942.3336201426	2784.0441113004	75.3643103907	366	897.2187395285	2828.1461422716	75.8582521497
335	933.4689598192	2787.4677393841	75.4837250325	367	897.8695029951	2828.7453887822	75.8521184215
336	925.1715886326	2799.5987774612	75.2650744444	368	901.3638114291	2829.6400517868	75.7988660596
337	918.9991618424	2801.9399963621	75.2041175810	369	899.2371844295	2835.0600499038	75.6514146469
338	955.3674104187	2779.5335370933	78.3227959269	370	896.1294008371	2834.3304397588	75.5961409107
339	947.7731178489	2784.6628907696	77.9681731479	371	893.0485326698	2834.4291659109	75.5270521111
340	927.5845253840	2800.2564929686	76.9211092626	372	887.6209827713	2837.5050965058	75.4711093206
341	926.9219626129	2807.3697248820	76.4266815142	373	885.7014227765	2832.0783420743	75.6007347501
342	923.1805736223	2803.2409459211	76.3901749484	374	853.2441825904	2873.2574819674	74.8541025639
343	931.3339449001	2805.4690651316	76.3832836950	375	852.7645769058	2868.6939295889	74.9884225204
344	931.0846432486	2806.3311462263	76.3928073743	376	850.7198717303	2870.7341273275	74.7825725164
345	932.6403066172	2806.8293565819	76.4095801064	377	843.3723753534	2876.2329573781	74.7795672326
346	933.2450765207	2806.9509543469	76.7402357559	378	846.0505648870	2880.6786462121	74.8733973421
347	932.3913634719	2808.9311590597	76.6626828851	379	841.4309745702	2872.8354835761	74.7790914588
348	924.2175700078	2806.5760089632	76.4043314241	380	847.3220655933	2865.6351545955	74.8058952579
349	920.5408144935	2812.2734738504	76.3390748455	381	847.4144504190	2861.0073751049	75.7855841313
350	923.8231792584	2807.5301670935	76.3920115803	382	855.6100106815	2858.3145228740	73.0685506858
351	923.3323494090	2809.1753881724	76.3805463621	382	855.5982738194	2858.2829738666	74.9189889653
352	911.9619305031	2803.3976105531	75.2734589084	383	864.6722099479	2854.1403636124	74.8849869322
353	907.0159353842	2811.0159779225	75.2127527463	384	864.6136976389	2844.8587867163	75.9185149854
354	894.3853521872	2817.6210147290	75.1487374094				
355	884.2923369585	2833.2724671426	75.0631599285				
356	909.8446271272	2809.3027735818	75.9512874708				
357	920.4913799492	2812.3294402541	77.0430587453				
358	917.2036348602	2823.9156497541	76.1437711603				
359	912.8074307188	2822.7521733093	76.0353960832				
360	911.6775168685	2827.0237649212	76.0188951667				
361	904.4456143832	2825.0131869013	75.0679411009				
362	905.5046195529	2820.4995805612	75.8436759657				
363	904.4380337291	2820.5622100645	75.8455111753				
364	903.5912526580	2821.0753250363	75.8295319226				



## 2. Reseña.

<b>Nombre de la base:</b>	E-1
<b>Sistema de referencia:</b>	ETRS89
<b>Proyección - sistema cartográfico:</b>	UTM, huso 31 hemisferio Norte Elipsoide SGR80, Datum ETRS89 Cotas referidas al NMMA
<b>Ajuste:</b>	ICC20060 (7 parámetros)
<b>X<sub>UTM</sub>:</b>	417760,071 m
<b>Y<sub>UTM</sub>:</b>	4575631,616 m
<b>H:</b>	+35,590 m
<b>Fecha Observación:</b>	Julio 2009
<b>Acimut a otras bases:</b>	<b>E-2:</b> 97,3325 g <b>B-1:</b> 97,9004 g <b>E-3:</b> 92,1201 g

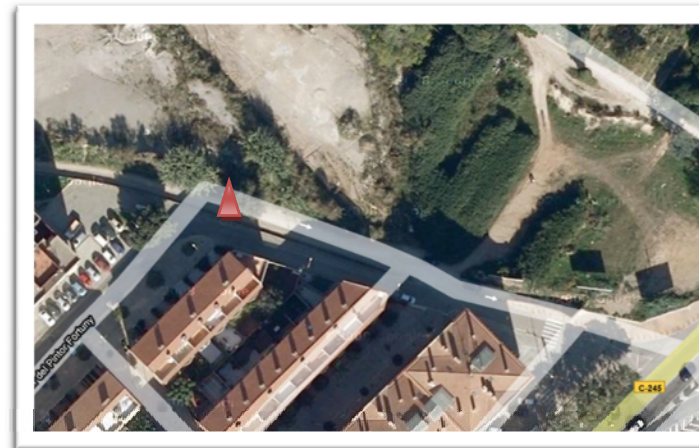
<b>Municipio</b>	Viladecans
<b>Comarca:</b>	Baix Llobregat
<b>Provincia:</b>	Barcelona
<b>Hoja MTN50:</b>	448 y 420
<b>λ:</b>	E 2° 0' 58,1611''
<b>φ:</b>	N 41° 19' 34,0333''
<b>K:</b>	0,99965668
<b>Descripción:</b>	Marca con espray en una de las esquinas de una tapa de electricidad. La calle no tiene nombre, es la continuación de la Avenida de la Fraternidad, pasada la rotonda, dirección Este.



<b>Nombre de la base:</b>	E-20
<b>Sistema de referencia:</b>	ETRS89
<b>Proyección - sistema cartográfico:</b>	UTM, huso 31 hemisferio Norte Elipsoide SGR80, Datum ETRS89 Cotas referidas al NMMA
<b>Ajuste:</b>	ICC20060 (7 parámetros)
<b>X<sub>UTM</sub>:</b>	418588,268 m
<b>Y<sub>UTM</sub>:</b>	4575095,172 m
<b>H:</b>	+10,799 m
<b>Fecha Observación:</b>	Julio 2009
<b>Acimut a otras bases:</b>	<b>E-19:</b> 313,801 g <b>B-4:</b> 309.8038 g <b>E-18:</b> 310.8301 g



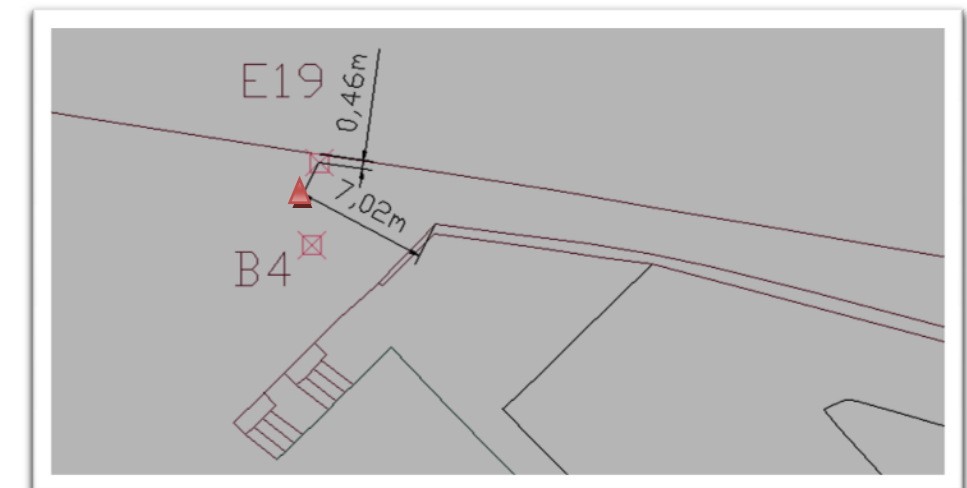
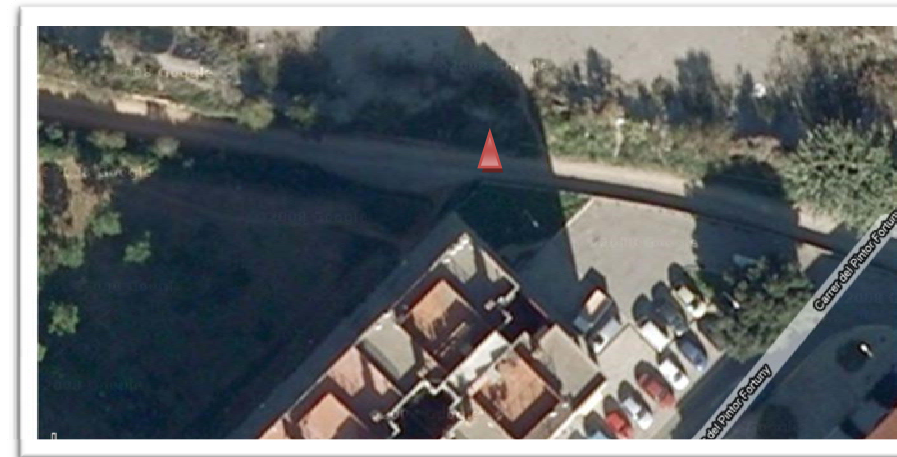
<b>Municipio</b>	Viladecans
<b>Comarca:</b>	Baix Llobregat
<b>Provincia:</b>	Barcelona
<b>Hoja MTN50:</b>	448 y 420
<b>λ:</b>	E 2° 1' 34,0422''
<b>φ:</b>	N 41° 19' 16,9428''
<b>K:</b>	0,99965668
<b>Descripción:</b>	Marca con espray al principio del camino de tierra llamado <i>Camí de les Oliveretes</i> .



<b>Nombre de la base:</b>	E-19
<b>Sistema de referencia:</b>	ETRS89
<b>Proyección - sistema cartográfico:</b>	UTM, huso 31 hemisferio Norte Elipsoide SGR80, Datum ETRS89 Cotas referidas al NMMA
<b>Ajuste:</b>	ICC20060 (7 parámetros)
<b>X<sub>UTM</sub>:</b>	418520,392 m
<b>Y<sub>UTM</sub>:</b>	4575110,154 m
<b>H:</b>	+11,019 m
<b>Fecha Observación:</b>	Julio 2009
<b>Acimut a otras bases:</b>	<b>B-4:</b> 205,676 g <b>E-20:</b> 86,199 g <b>E-18:</b> 308,521 g



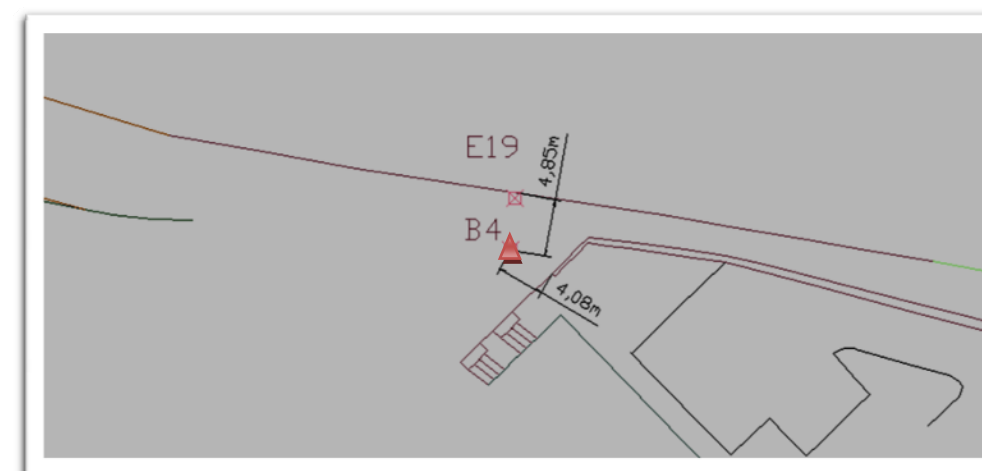
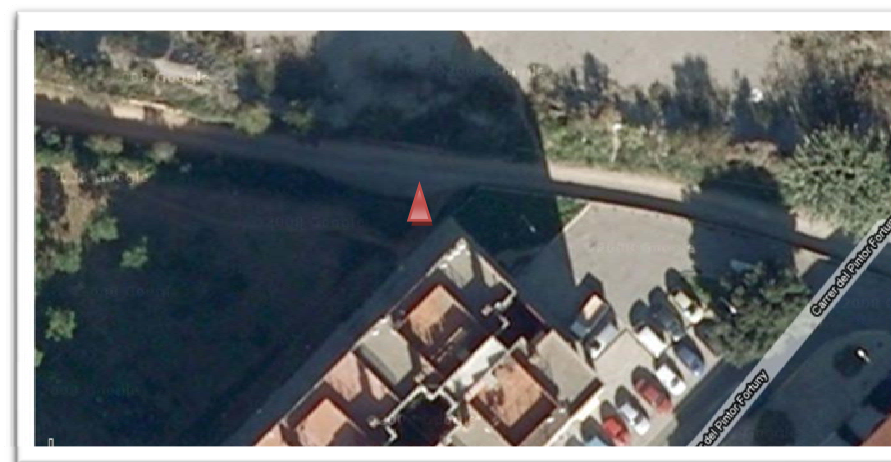
<b>Municipio</b>	Viladecans
<b>Comarca:</b>	Baix Llobregat
<b>Provincia:</b>	Barcelona
<b>Hoja MTN50:</b>	448 y 420
<b>λ:</b>	E 2° 1' 31,1156''
<b>φ:</b>	N 41° 19' 17,4036''
<b>K:</b>	0,99965668
<b>Descripción:</b>	Marca con espray en el camino de tierra llamado <i>Camí de les Oliveretes</i>



<b>Nombre de la base:</b>	B-4
<b>Sistema de referencia:</b>	ETRS89
<b>Proyección - sistema cartográfico:</b>	UTM, huso 31 hemisferio Norte Elipsoide SGR80, Datum ETRS89 Cotas referidas al NMMA
<b>Ajuste:</b>	ICC20060 (7 parámetros)
<b>X<sub>UTM</sub>:</b>	418520,000 m
<b>Y<sub>UTM</sub>:</b>	4575105,769 m
<b>H:</b>	+10,894 m
<b>Fecha Observación:</b>	Julio 2009
<b>Acimut a otras bases:</b>	E-19: 194,324 g E-20: 90,196 g E-18: 311,613 g



<b>Municipio</b>	Viladecans
<b>Comarca:</b>	Baix Llobregat
<b>Provincia:</b>	Barcelona
<b>Hoja MTN50:</b>	448 y 420
<b>λ:</b>	E 2° 1' 31,1100''
<b>φ:</b>	N 41° 19' 17,2614''
<b>K:</b>	0,99965668
<b>Descripción:</b>	Marca con espray en una zona de arbustos a un lados del camino



### 3. Datos SKI-Pro

#### - Estaciones de referencia

##### o Garraf

Summary file for : GARR199L.09o  
 Created (Local) : 02/11/2009 11:30:29  
 Order ID : 1828  
 Order number : 18  
 File ID : 2554  
 Input parameter :  
 Start time (GPS) : 18/07/2009 11:00:00  
 End time (GPS) : 18/07/2009 17:30:00  
 Interval : 15.0  
 Vrs request : false  
 Station : GARR  
 Add ephemeris : false  
 Use HATANAKA compression : true  
 Result :  
 Generation detail : 100  
 Generation status : Successful  
 Effective minutes : 390  
 Available epochs : 1559  
 Rinex file size : 2105711  
 Ephemeris enclosed : false  
 Data analysis :  
 Block 0 start : 18/07/2009 11:00:00  
 Block 0 end : 18/07/2009 17:29:45  
 Block 0 good Epochs : 1559  
 Block 0 missing Epochs : 1

##### o Les Planes

Summary file for : PLAN199L.09o  
 Created (Local) : 02/11/2009 11:33:56  
 Order ID : 1829  
 Order number : 19  
 File ID : 2555  
 Input parameter :  
 Start time (GPS) : 18/07/2009 11:00:00  
 End time (GPS) : 18/07/2009 17:30:00  
 Interval : 15.0  
 Vrs request : false  
 Station : PLAN  
 Add ephemeris : false  
 Use HATANAKA compression : true  
 Result :  
 Generation detail : 100  
 Generation status : Successful  
 Effective minutes : 390  
 Available epochs : 1560  
 Rinex file size : 2077125  
 Ephemeris enclosed : false  
 Data analysis :  
 Block 0 start : 18/07/2009 11:00:00  
 Block 0 end : 18/07/2009 17:29:45  
 Block 0 good Epochs : 1560  
 Block 0 missing Epochs : 0

## - Report

3D constrained network on WGS 84 ellipsoid

## STATIONS

Number of (partly) known stations 2

Number of unknown stations 4

Total 6

## OBSERVATIONS

GPS coordinate differences 24 (8 baselines)

Known coordinates 6

Total 30

## UNKNOWNNS

Coordinates 18

Total 18

Degrees of freedom 12

## ADJUSTMENT

Number of iterations 0

Max coord correction in last iteration 0.0000 m

## TESTING

Alfa (multi dimensional) 0.0528

Alfa 0 (one dimensional) 0.0010

Beta 0.80

Critical value W-test 3.29

Critical value T-test (3 dimensional) 4.24

Critical value T-test (2 dimensional) 5.91

Critical value F-test 1.74

F-test 3.133 rejected

Results based on a-posteriori variance factor

## ELLIPSOID CONSTANTS

Ellipsoid WGS 84

Semi major axis 6378137.0000 m

Inverse flattening 298.257223563

## COORDINATES (CONSTRAINED NETWORK)

Station	Coordinate	Corr	Prec(68.3%)
E16 Latitude	41 19 17.92045 N	0.0000	0.0137 m
Longitude	2 01 25.61813 E	0.0000	0.0063 m
Height	61.1883	-0.0000	0.0157 m
E17 Latitude	41 19 17.76194 N	0.0000	0.0465 m
Longitude	2 01 27.26163 E	0.0000	0.0544 m
Height	60.3275	-0.0000	0.1002 m
E8 Latitude	41 19 29.94814 N	-0.0000	0.0087 m
Longitude	2 01 07.07061 E	-0.0000	0.0054 m
Height	86.6612	0.0000	0.0206 m
E9 Latitude	41 19 25.14316 N	-0.0000	0.0057 m
Longitude	2 01 10.18819 E	-0.0000	0.0036 m
Height	77.6459	0.0000	0.0142 m
GARR Latitude	41 17 34.57612 N*	0.0000	fixed m
Longitude	1 54 50.52822 E*	0.0000	fixed m
Height	634.4809*	0.0000	fixed m
PLAN Latitude	41 25 06.68955 N*	0.0000	fixed m
Longitude	1 59 13.02625 E*	0.0000	fixed m
Height	319.9546*	-0.0000	fixed m

## ABSOLUTE CONFIDENCE REGIONS (ERROR ELLIPSES) 2D - 39.4% 1D - 68.3%

Station	A	B	A/B	Phi	Hgt(68.3%)
E16	0.0140	0.0058 m	2.4	11 deg	0.0157 m
E17	0.0649	0.0305 m	2.1	-52 deg	0.1002 m
E8	0.0089	0.0051 m	1.7	15 deg	0.0206 m
E9	0.0058	0.0035 m	1.7	12 deg	0.0142 m
GARR	0.0000	0.0000 m	0.0	18 deg	0.0000 m
PLAN	0.0000	0.0000 m	0.0	18 deg	0.0000 m

## ADJUSTED OBSERVATIONS

	Station	Target	Adj obs	Resid	Resid(ENH)	Sd
DX	GARR	E9	-2971.5712	-0.0033	-0.0012	0.0129 m
DY			8735.1696	-0.0013	-0.0043	0.0036 m

DZ		2194.7987	-0.0088	-0.0083	0.0083 m	
DX	GARR	E8	-3060.0730	-0.0038	-0.0022	0.0183 m
DY		8659.5011	-0.0023	-0.0053	0.0054 m	
DZ		2312.0743	-0.0104	-0.0098	0.0129 m	
DX	GARR	E17	-2848.3133	-0.0831	-0.0682	0.1009 m
DY		9136.8418	-0.0710	0.0498	0.0564 m	
DZ		2012.3498	-0.0088	-0.0700	0.0429 m	
DX	GARR	E16	-2849.5440	-0.0178	-0.0064	0.0117 m
DY		9098.5515	-0.0070	-0.0004	0.0063 m	
DZ		2016.5907	-0.0163	-0.0244	0.0174 m	
DX	PLAN	E9	6683.1808	0.0074	0.0032	0.0129 m
DY		2958.2706	0.0035	0.0090	0.0036 m	
DZ		-8067.6883	0.0187	0.0180	0.0083 m	
DX	PLAN	E8	6594.6790	0.0071	0.0038	0.0183 m
DY		2882.6021	0.0040	0.0089	0.0054 m	
DZ		-7950.4127	0.0182	0.0175	0.0129 m	
DX	PLAN	E17	6806.4387	0.0792	0.0654	0.1009 m
DY		3359.9428	0.0682	-0.0468	0.0564 m	
DZ		-8250.1372	0.0095	0.0674	0.0429 m	
DX	PLAN	E16	6805.2080	0.0223	0.0079	0.0117 m
DY		3321.6525	0.0087	0.0003	0.0063 m	
DZ		-8245.8963	0.0204	0.0304	0.0174 m	

## GPS BASELINE VECTOR RESIDUALS

	Station	Target	Adj vector	Resid	Resid ppm
DV	GARR	E9	9484.2271	0.0095 m	1.0 ppm
DV	GARR	E8	9470.8338	0.0113 m	1.2 ppm
DV	GARR	E17	9779.7913	0.1097 m	11.2 ppm
DV	GARR	E16	9745.2644	0.0252 m	2.6 ppm
DV	PLAN	E9	10885.9480	0.0204 m	1.9 ppm
DV	PLAN	E8	10724.1899	0.0200 m	1.9 ppm
DV	PLAN	E17	11210.7800	0.1049 m	9.4 ppm
DV	PLAN	E16	11195.4918	0.0315 m	2.8 ppm

## TEST OF OBSERVATIONS

	Station	Target	MDB	Red	BNR	W-test	T-test
DX	GARR	E9	0.0731 m	42	5.3	1.07	1.21
DY		0.0288 m	40	5.0	0.04		
DZ		0.0463 m	31	5.7	-1.76		
DX	GARR	E8	0.1064 m	47	4.7	0.58	0.53
DY		0.0428 m	45	4.5	-0.17		
DZ		0.0743 m	36	5.2	-1.09		
DX	GARR	E17	0.4043 m	53	3.7	-0.35	0.55
DY		0.3559 m	52	3.9	-0.74		
DZ		0.2010 m	53	3.7	0.33		
DX	GARR	E16	0.0933 m	44	4.6	-1.76	1.71
DY		0.0489 m	44	4.6	-1.30		
DZ		0.1336 m	44	4.6	-0.25		
DX	PLAN	E9	0.0731 m	58	3.3	-1.07	1.21
DY		0.0288 m	60	3.4	-0.04		
DZ		0.0463 m	69	3.0	1.76		
DX	PLAN	E8	0.1064 m	53	3.7	-0.58	0.53
DY		0.0428 m	55	3.8	0.17		
DZ		0.0743 m	64	3.4	1.09		
DX	PLAN	E17	0.4043 m	47	4.6	0.35	0.55
DY		0.3559 m	48	4.4	0.74		
DZ		0.2010 m	47	4.6	-0.33		
DX	PLAN	E16	0.0933 m	56	3.7	1.76	1.71
DY		0.0489 m	56	3.7	1.30		
DZ		0.1336 m	56	3.7	0.25		

#### 4. Listados de los diferentes ejes en planta y alzado.

- Planta

o eix\_principal

ALIN	TIPO	P.K.	LONGITUD	X Tang.	Y Tang.	AZIMUT	RADIO
			XC o I	YC o I	PARAMETRO		
1	RECTA	0,000	130,479	417752,726	4575630,955	92,2249	0,000
			0,000	0,000			
2	CLOT.	130,479	46,662	417882,234	4575646,851	92,2249	-54,000
			417882,234	4575646,851			
3	CIRC.	177,141	53,884	417928,607	4575646,750	115,9926	62,492
			417913,073	4575586,220			
4	CLOT.	231,026	46,662	417969,143	4575613,813	170,8858	54,000
			417978,732	4575568,442			
5	RECTA	277,688	0,004	417978,732	4575568,442	194,6535	0,000
			0,000	0,000			
6	CLOT.	277,692	79,564	417978,733	4575568,438	194,6535	158,000
			417978,733	4575568,438			
7	CIRC.	357,256	172,296	417988,743	4575489,564	186,5818	-313,760
			418295,560	4575555,207			
8	CLOT.	529,551	79,564	418068,114	4575339,073	151,6230	-158,000
			418127,554	4575286,268			
9	RECTA	609,115	70,281	418127,554	4575286,268	143,5512	0,000
			0,000	0,000			
10	CLOT.	679,396	83,015	418182,020	4575241,852	143,5512	189,000
			418182,020	4575241,852			
11	CIRC.	762,410	126,597	418247,981	4575191,505	137,4103	-430,298
			418486,538	4575549,621			
12	CLOT.	889,008	83,015	418362,079	4575137,716	118,6804	-189,000
			418442,891	4575118,869			
13	RECTA	972,022	188,742	418442,891	4575118,869	112,5394	0,000
			0,000	0,000			
14	RECTA	1160,764	0,000	418627,983	4575081,933	112,5394	0,000
			0,000	0,000			

o el

ALIN	TIPO	P.K.	LONGITUD	X Tang.	Y Tang.	AZIMUT	RADIO
			XC o I	YC o I	PARAMETRO		
1	RECTA	0,000	0,208	417960,627	4575364,935	0,4260	0,000
			0,000	0,000			
2	CIRC.	0,208	3,476	417960,628	4575365,143	0,4260	4,970
			417965,598	4575365,110			
3	RECTA	3,685	0,863	417961,817	4575368,335	44,9559	0,000
			0,000	0,000			
4	CIRC.	4,548	4,611	417962,377	4575368,991	44,9559	16,330
			417974,801	4575358,394			
5	RECTA	9,159	13,805	417965,822	4575372,034	62,9336	0,000
			0,000	0,000			
6	CIRC.	22,964	22,331	417977,352	4575379,625	62,9336	27,850
			417992,667	4575356,364			
7	RECTA	45,296	4,221	417998,734	4575383,545	113,9808	0,000
			0,000	0,000			
8	CIRC.	49,517	36,861	418002,854	4575382,626	113,9808	57,350
			417990,360	4575326,653			
9	RECTA	86,377	41,674	418033,910	4575363,969	154,8983	0,000
			0,000	0,000			
10	CIRC.	128,052	21,350	418061,026	4575332,322	154,8983	-111,650
			418145,809	4575404,969			
11	RECTA	149,402	43,716	418076,379	4575317,532	142,7244	0,000
			0,000	0,000			
12	CIRC.	193,118	26,149	418110,614	4575290,347	142,7244	-404,090
			418361,900	4575606,802			
13	RECTA	219,267	30,797	418131,603	4575274,760	138,6048	0,000
			0,000	0,000			
14	RECTA	250,064	0,000	418156,909	4575257,209	138,6048	0,000
			0,000	0,000			



o e2

ALIN	TIPO	P.K.	LONGITUD	X Tang.	Y Tang.	AZIMUT	RADIO
			XC o I	YC o I		PARAMETRO	
1	RECTA	0,000	3,883	417948,713	4575377,936	114,3777	0,000
			0,000	0,000			
2	CIRC.	3,883	12,314	417952,497	4575377,066	114,3777	-14,233
			417955,684	4575390,938			
3	RECTA	16,197	14,920	417964,177	4575379,516	59,2979	0,000
			0,000	0,000			
4	CIRC.	31,117	56,684	417976,150	4575388,419	59,2979	-45,000
			417949,300	4575424,531			
5	RECTA	87,802	23,394	417991,898	4575439,036	379,1058	0,000
			0,000	0,000			
6	CIRC.	111,196	102,477	417984,357	4575461,181	379,1058	256,520
			418227,184	4575543,869			
7	RECTA	213,673	23,527	417971,316	4575562,140	4,5382	0,000
			0,000	0,000			
8	RECTA	237,200	0,000	417972,992	4575585,607	4,5382	0,000
			0,000	0,000			

o e3

ALIN	TIPO	P.K.	LONGITUD	X Tang.	Y Tang.	AZIMUT	RADIO
			XC o I	YC o I		PARAMETRO	
1	RECTA	0,000	4,968	418424,069	4575076,030	47,9438	0,000
			0,000	0,000			
2	CIRC.	4,968	77,900	418427,466	4575079,654	47,9438	78,891
			418485,023	4575025,700			
3	RECTA	82,868	21,807	418498,350	4575103,458	110,8061	0,000
			0,000	0,000			
4	RECTA	104,675	0,000	418519,844	4575099,774	110,8061	0,000
			0,000	0,000			

o es

ALIN	TIPO	P.K.	LONGITUD	X Tang.	Y Tang.	AZIMUT	RADIO
			XC o I	YC o I		PARAMETRO	
1	RECTA	0,000	0,050	417957,943	4575371,031	63,1082	0,000
			0,000	0,000			
2	CIRC.	0,050	0,014	417957,985	4575371,058	63,1082	-14,758
			417949,903	4575383,407			
3	RECTA	0,064	63,731	417957,997	4575371,065	63,0485	0,000
			0,000	0,000			
4	RECTA	63,795	0,000	418011,290	4575406,015	63,0485	0,000
			0,000	0,000			

o puente

ALIN	TIPO	P.K.	LONGITUD	X Tang.	Y Tang.	AZIMUT	RADIO
			XC o I	YC o I		PARAMETRO	
1	RECTA	0,000	2,591	418421,721	4575079,177	50,3494	0,000
			0,000	0,000			
2	CLOT.	2,591	49,613	418423,563	4575080,999	50,3494	-61,000
			418423,563	4575080,999			
3	CIRC.	52,205	34,310	418462,270	4575111,649	71,4060	75,000
			418494,835	4575044,088			
4	CLOT.	86,515	49,613	418495,458	4575119,086	100,5292	61,000
			418543,543	4575107,882			
5	RECTA	136,128	38,278	418543,543	4575107,882	121,5858	0,000
			0,000	0,000			
6	RECTA	174,406	0,000	418579,642	4575095,150	121,5858	0,000
			0,000	0,000			

- Alzado

o eix\_principal

NR P.K. COTA PENDIENTE%/PARAMETRO

P.K. INICIO 0,0000 35,0424 6,3500

TANGENTE ENTRADA 98,8227 41,3176 6,3500

1 VERTICE 154,3227 44,8418 -1000,0000

TANGENTE SALIDA 209,8227 42,2056 -4,7500

TANGENTE ENTRADA 633,6340 22,0746 -4,7500

2 VERTICE 635,9840 21,9629 200,0000

TANGENTE SALIDA 638,3340 21,9065 -2,4000

P.K.FINAL 1150,0000 9,6265 -2,4000

o e1

NR P.K. COTA PENDIENTE%/PARAMETRO

P.K. INICIO 0,0000 29,7955 -1,3000

TANGENTE ENTRADA 101,3452 28,4780 -1,3000

1 VERTICE 104,1404 28,4417 -156,1110

TANGENTE SALIDA 106,9355 28,3053 -4,8810

P.K.FINAL 250,1000 21,3174 -4,8810

o e2

NR P.K. COTA PENDIENTE%/PARAMETRO

P.K. INICIO 0,0000 29,7173 4,1500

TANGENTE ENTRADA 197,6168 37,9184 4,1500

1 VERTICE 198,0688 37,9371 -200,0000

TANGENTE SALIDA 198,5208 37,9539 3,6980

P.K.FINAL 238,2000 39,4212 3,6980

o e3

NR P.K. COTA PENDIENTE%/PARAMETRO

P.K. INICIO 0,0000 17,4040 -7,0000

TANGENTE ENTRADA 62,2054 13,0496 -7,0000

1 VERTICE 66,4314 12,7538 200,0000

TANGENTE SALIDA 70,6574 12,6366 -2,7740

P.K.FINAL 89,3000 12,1195 -2,7740

o es  
NR P.K. COTA PENDIENTE%/PARAMETRO

P.K. INICIO 0,0000 29,8276 -1,4000

TANGENTE ENTRADA 2130,5426 0,0000 -1,4000

1 VERTICE 2130,5426 0,0000 0,0000

TANGENTE SALIDA 2130,5426 0,0000 0,0000

P.K.FINAL 0,0000 29,8276 -1,4000

o puente

NR P.K. COTA PENDIENTE%/PARAMETRO

P.K. INICIO 0,0000 17,4192 -1,0500

TANGENTE ENTRADA 29,9448 17,1048 -1,0500

1 VERTICE 34,1448 17,0607 -200,0000

TANGENTE SALIDA 38,3448 16,8402 -5,2500

P.K.FINAL 175,0000 9,6658 -5,2500

## 5. Listados de sección de carretera y peraltes.

P.K.	BERMA EXT.	ARCEN EXT.	CALZADA	CALZADA	ARCEN EXT.	BERMA EXT.							
							576,55	0	1	3,5	-8	1	0
- Sección de carretera							580	0	1	3,5	-7,89	1	0
o eix_principal							585	*	*	*	-7,75	1	0
							590	0	1	3,5	-7,64	1	0
0	0	1	3,5	3,5	1	0	595	0	1	3,5	-7,54	1	0
257,85	0	1	3,5	-3,5	1	0	600	0	1	3,5	-7,41	1	0
260	0	1	3,5	-4,12	1	0	605	0	1	3,5	-7,23	1	0
265	0	1	3,5	-5,14	1	0	609,87	0	1	3,5	-6,99	1	0
270	0	1	3,5	-5,85	1	0	610	0	1	3,5	-6,99	1	0
275	0	1	3,5	-6,61	1	0	615	0	1	3,5	-6,69	1	0
281,44	0	1	3,5	-7,54	1	0	620	0	1	3,5	-6,32	1	0
284,08	0	1	3,5	-7,96	1	0	625	0	1	3,5	-5,93	1	0
291,17	0	1	3,5	-8,96	1	0	630	0	1	3,5	-5,54	1	0
291,75	0	1	3,5	-3,5	1	0	635	0	1	3,5	-5,15	1	0
300	0	1	3,5	3,5	1	0	640	0	1	3,5	-4,77	1	0
340	0	1	-7	3,5	1	0	645	0	1	3,5	-4,38	1	0
550	0	1	7	3,5	1	0	650	0	1	3,5	-3,99	1	0
556,58	0	1	3,5	-3,5	1	0	660,02	0	1	3,5	-3,5	1	0
556,88	0	1	3,5	-8,99	1	0	1003,69	0	1	3,5	3,5	1	0
560	0	1	3,5	-8,78	1	0	1005,2	0	1	3,5	-8,74	1	0
565	0	1	3,5	-8,5	1	0	1007,96	0	1	3,5	-7,82	1	0
570	0	1	3,5	-8,25	1	0	1011,18	0	1	3,5	-6,88	1	0



## - Peraltes

o eix_principal		
P.K.	PERALTE IZQ.	PERALTE DER.
0,000	-2,00 %	2,00 %
110,479	-2,00 %	2,00 %
111,706	-2,00 %	2,00 %
111,867	-2,00 %	2,00 %
118,811	-2,00 %	2,00 %
130,479	0,00 %	2,00 %
131,706	0,00 %	2,00 %
131,867	0,00 %	2,00 %
138,811	0,00 %	2,00 %
143,811	2,00 %	2,00 %
145,038	2,00 %	2,00 %
145,199	2,00 %	2,00 %
152,143	2,00 %	2,00 %
177,141	7,00 %	7,00 %
178,368	7,00 %	7,00 %
178,529	7,00 %	7,00 %
185,473	7,00 %	7,00 %
231,026	7,00 %	7,00 %
234,764	-2,00 %	-2,00 %
240,634	7,00 %	7,00 %
247,458	7,00 %	7,00 %
247,740	7,00 %	7,00 %
255,203	2,00 %	2,00 %
261,030	0,00 %	0,00 %
264,357	2,00 %	2,00 %
276,258	-2,00 %	-2,00 %
277,692	-2,00 %	-2,00 %
283,055	2,00 %	2,00 %
286,810	2,00 %	2,00 %
287,296	2,00 %	2,00 %

## o e1

P.K.	PERALTE IZQ.	PERALTE DER.
0,000	-2,00 %	2,00 %
0,208	7,00 %	7,00 %
3,685	7,00 %	7,00 %
4,116	2,00 %	2,00 %
4,548	7,00 %	7,00 %
9,159	7,00 %	7,00 %
16,062	2,00 %	2,00 %
22,964	7,00 %	7,00 %
45,296	7,00 %	7,00 %
47,406	2,00 %	2,00 %
49,517	7,00 %	7,00 %
86,377	7,00 %	7,00 %
107,215	0,00 %	0,00 %
128,052	-7,00 %	-7,00 %
149,402	-7,00 %	-7,00 %
156,111	-1,68 %	-1,68 %
171,260	-2,00 %	-2,00 %
193,118	-6,55 %	-6,55 %
219,267	-6,55 %	-6,55 %
264,815	-2,00 %	-2,00 %

## o e2

P.K.	PERALTE IZQ.	PERALTE DER.
0,000	-2,00 %	2,00 %
3,883	-7,00 %	-7,00 %
16,197	-7,00 %	-7,00 %
23,657	-2,00 %	-2,00 %
31,117	-7,00 %	-7,00 %
87,802	-7,00 %	-7,00 %
99,499	0,00 %	0,00 %
111,196	7,00 %	7,00 %
205,732	-1,38 %	-1,38 %
237,200	2,00 %	2,00 %

## ○ e3

P.K.	PERALTE IZQ.	PERALTE DER.
0,000	-2,00 %	2,00 %
4,968	7,00 %	7,00 %
58,206	2,33 %	2,33 %
82,868	7,00 %	7,00 %
104,675	2,00 %	2,00 %

## ○ es

P.K.	PERALTE IZQ.	PERALTE DER.
0,000	-2,00 %	2,00 %
0,050	-7,00 %	-7,00 %
0,064	-7,00 %	-7,00 %
50,064	-2,00 %	-2,00 %
63,795	-2,00 %	0,00 %

## ○ puente

P.K.	PERALTE IZQ.	PERALTE DER.
0,000	-2,00 %	2,00 %
1,296	-2,00 %	2,00 %
2,591	0,00 %	2,00 %
16,766	2,00 %	2,00 %
45,063	3,61 %	3,61 %
52,205	7,00 %	7,00 %
86,515	7,00 %	7,00 %
121,953	2,00 %	2,00 %
136,128	0,00 %	2,00 %
156,128	-2,00 %	2,00 %
174,406	2,00 %	2,00 %



## 7. Cálculo de conexiones de entrada y de salida de ramales

o e1

### CONEXION DE ENTRADA

Eje Principal: EIX\_PRINCIPAL.PLR Eje que conecta: E1.PLR

FICHERO EJE 1:eix\_principal.plr Ancho de calzada CONSTANTE

del : PK 0,000 3,50

al : PK 1160,764 3,50

Dist. borde calz. a nariz = 1,00

FICHERO EJE 2: e1.plr Ancho de calzada CONSTANTE

del : PK 0,000 -3,50

al : PK 250,064 -3,50

Dist. borde calz. a nariz = 1,00

Peralte del EJE-2 respecto el EJE-1 : IGUAL

Sentido EJE-1 = EJE-2

### RESULTADOS

	EJE 1	EJE 2	COORDENADAS
NARIZ: P.K. ....:	556,579	156,111	418084,431
Dist. al EJE...:	4,500	-4,500	4575316,884
Cota sobre EJE.:	25,735	25,905	25,830
Peralte EJE....:	-2,114	-1,677	
PK sobre EJE-1.:		556,881	
Dist al EJE-1.:		8,990	

### DEDUCCION PENDIENTE DE SALIDA:

Dist. respecto a NARIZ..:	2,911	6,077	13,640
Cota punto posterior....:	25,777	25,623	25,258
Pendiente resultante....:	-4,960	-4,867	-4,816

OPCION SELECCIONADA: P.K. al Origen : 156,111

Cota de salida : 25,905

Pendiente (Media): -4,881

Peralte EJE-2. : -1,677

Deducción del corazón, considerado a: 0,000 m. entre rayas blancas

	EJE 1	EJE 2	COORDENADAS
CORAZON: P.K. ....:	609,679	209,587	418125,779
Dist. al EJE...:	3,500	-3,500	4575283,199
Cota Corazón...:			23,282
Peralte EJE....:	-2,000	-1,742	

Cálculo del punto, donde la sep. de las rayas blancas es de 1,00 m.

	EJE 1	EJE 2	COORDENADAS
P.K. ....:	576,418	176,094	418099,769
Dist. al EJE...:	4,000	-4,000	4575304,067
Cota ....:			24,872

o e2

### CONEXION DE SALIDA

Eje Principal: EIX\_PRINCIPAL.PLR Eje que conecta: E2.PLR

FICHERO EJE 1:eix\_principal.plr Ancho de calzada CONSTANTE

del : PK 0,000 3,50

al : PK 1160,764 3,50

Dist. borde calz. a nariz = 1,00

FICHERO EJE 2: e2.plr Ancho de calzada CONSTANTE

del : PK 0,000 3,50

al : PK 239,202 3,50

Dist. borde calz. a nariz = 1,00

Peralte del EJE-2 respecto el EJE-1 : IGUAL

Sentido EJE-1 <> EJE-2



## RESULTADOS

	EJE 1	EJE 2	COORDENADAS
NARIZ: P.K. ....:	293,687	203,819	417975,620
Dist. al EJE...:	4,500	4,500	4575552,101
Cota sobre EJE.:	38,222	38,069	38,132
Peralte EJE....:	2,000	-1,395	
PK sobre EJE-1.:		293,129	
Dist al EJE-1.:		8,965	

## DEDUCCION PENDIENTE DE SALIDA:

Dist. respecto a NARIZ..:	5,057	10,032	13,917
Cota punto anterior.....:	38,289	38,540	38,908
Pendiente resultante.....:	4,948	4,952	6,372

OPCION SELECCIONADA: P.K. al Origen : 203,819

Cota de salida : 38,069

Pendiente (Media): 5,424

Peralte EJE-2. : -1,395

Deducción del corazón, considerado a: 0,000 m. entre rayas blancas

	EJE 1	EJE 2	COORDENADAS
CORAZON: P.K. ....:	278,277	219,287	417975,294
Dist. al EJE...:	3,500	3,500	4575567,561
Cota Corazón...:			39,009
Peralte EJE....:	-1,564	2,822	

Cálculo del punto, donde la sep. de las rayas blancas es de 1,00 m.

	EJE 1	EJE 2	COORDENADAS
P.K. ....:	286,031	211,527	417975,451
Dist. al EJE...:	4,000	4,000	4575559,787
Cota .....			38,506

o e3

## CONEXION DE ENTRADA

Eje Principal: EIX\_PRINCIPAL.PLR Eje que conecta: E3.PLR

FICHERO EJE 1:eix\_principal.plr Ancho de calzada CONSTANTE

del : PK 0,000 3,50

al : PK 1160,764 3,50

Dist. borde calz. a nariz = 1,00

FICHERO EJE 2: e3.plr Ancho de calzada CONSTANTE

del : PK 0,000 -3,50

al : PK 104,676 -3,50

Dist. borde calz. a nariz = 1,00

Peralte del EJE-2 respecto el EJE-1 : IGUAL

Sentido EJE-1 = EJE-2

## RESULTADOS

	EJE 1	EJE 2	COORDENADAS
NARIZ: P.K. ....:	1003,691	58,143	418473,067
Dist. al EJE...:	4,500	-4,500	4575108,259
Cota sobre EJE.:	13,138	12,985	13,090
Peralte EJE....:	1,072	2,324	
PK sobre EJE-1.:		1005,197	
Dist al EJE-1.:		8,741	

## DEDUCCION PENDIENTE DE SALIDA:

Dist. respecto a NARIZ..:	4,622	5,563	5,563
Cota punto posterior.....:	12,880	12,854	12,854
Pendiente resultante.....:	-2,928	-2,731	-2,731

OPCION SELECCIONADA: P.K. al Origen : 58,143

Cota de salida : 12,985

Pendiente (Media): -2,796

Peralte EJE-2. : 2,324

Deducción del corazón, considerado a: 0,000 m. entre rayas blancas

	EJE 1	EJE 2	COORDENADAS
CORAZON: P.K. ....:	1010,271	64,407	418479,715
Dist. al EJE...:	3,500	-3,500	4575107,952
Cota Corazón...:			12,910
Peralte EJE...:	2,000	2,553	

Cálculo del punto, donde la sep. de las rayas blancas es de 1,00 m.

	EJE 1	EJE 2	COORDENADAS
P.K. ....:	1006,762	61,057	418476,176
Dist. al EJE...:	4,000	-4,000	4575108,148
Cota .....			13,000

o puente

CONEXION DE SALIDA

Eje Principal: EIX\_PRINCIPAL.PLR Eje que conecta:PUENTE.PLR

FICHERO EJE 1:eix\_principal.plr Ancho de calzada CONSTANTE

del : PK 0,000 3,50

al : PK 1160,764 3,50

Dist. borde calz. a nariz = 1,00

FICHERO EJE 2: puente.plr Ancho de calzada CONSTANTE

del : PK 0,000 -3,50

al : PK 174,406 -3,50

Dist. borde calz. a nariz = 1,00

Peralte del EJE-2 respecto el EJE-1 : IGUAL

Sentido EJE-1 <> EJE-2

## RESULTADOS

	EJE 1	EJE 2	COORDENADAS
NARIZ: P.K. ....:	983,924	45,063	418566.0676
Dist. al EJE...:	4,500	-4,500	4575098.8772
Cota sobre EJE.:	13,612	13,440	10,542
Peralte EJE...:	2,00	3,606	
PK sobre EJE-1.:		986,940	
Dist al EJE-1.:		7,840	

DEDUCCION PENDIENTE DE SALIDA:

Dist. respecto a NARIZ...:	2,314	2,314	2,314
Cota punto anterior.....:	13,558	13,558	13,558
Pendiente resultante.....:	-2,617	-2,617	-2,617

OPCION SELECCIONADA: P.K. al Origen : 45,063

Cota de salida : 13,440

Pendiente (Media): -2,617

Peralte EJE-2. : 3,606

Deducción del corazón, considerado a: 0,000 m. entre rayas blancas

	EJE 1	EJE 2	COORDENADAS
CORAZON: P.K. ....:	986,582	47,602	418579.6419
Dist. al EJE...:	3,500	-3,500	457509,1500
Cota Corazón...:			10,580
Peralte EJE...:	1,148	3,823	

Cálculo del punto, donde la sep. de las rayas blancas es de 1,00 m.

	EJE 1	EJE 2	COORDENADAS
P.K. ....:	985,238	46,316	418555,068
Dist. al EJE...:	4,000	-4,000	457506,360
Cota .....			10,554

**8. Listado de intersección de ejes.**

PUNTOS INTERSECCION: CALCULO DE SUS COORDENADAS -> Fichero:INTERSECCIÓN.INT

Nombre de los ficheros de la Planta: EIX\_PRINCIPAL.PLR/PUENTE.PLR

Nombre de los ficheros de alzado : EIX\_PRINCIPAL.ALZ/PUENTE.ALZ

Nombre de los ficheros de peraltes : EIX\_PRINCIPAL.PER/PUENTE.PER

Fecha/hora listado: 10/06/2010 15:25:12

RESULTADOS EN EJE 1			COORDENADA		RESULTADOS EN EJE 2				
PUNTO	PK 1	DIST.1	COTA 1	X	Y	PK 2	DIST.2	COTA 2	DIF.COTA
1	1007.649	-4.50	13.112	418478.710	4575116.310	69.416	1.00	15.139	-2.027
2	992.498	4.50	13.317	418462.090	4575110.449	51.512	1.00	16.082	-2.766
3	983.924	4.50	13.602	418453.682	4575112.127	45.063	-4.50	16.650	-3.047
4	995.870	-4.50	13.236	418467.158	4575118.615	59.223	-4.50	16.059	-2.823

## 9. Mediciones y listados

o eix\_principal

## CUBICACION DE FIRMES

PK	VOLUMEN (M3)									
	CAPA 1	CAPA 2	CAPA 3	CAPA 4	CAPA 5	CAPA 6	CAPA 7	CAPA 8	CAPA 9	CAPA 10
0	0,453	0,458	0	0,277	3,87	0	0	0	0	0
20	0,453	0,458	0	0,277	3,87	0	0	0	0	0
40	0,453	0,458	0	0,277	3,87	0	0	0	0	0
60	0,453	0,458	0	0,277	3,87	0	0	0	0	0
80	0,453	0,458	0	0,277	3,87	0	0	0	0	0
100	0,453	0,458	0	0,277	3,87	0	0	0	0	0
120	0,453	0,458	0	0,277	3,869	0	0	0	0	0
140	0,453	0,458	0	0,277	3,866	0	0	0	0	0
160	0,453	0,458	0	0,277	3,864	0	0	0	0	0
180	0,453	0,458	0	0,277	3,865	0	0	0	0	0
200	0,453	0,458	0	0,277	3,865	0	0	0	0	0
220	0,453	0,458	0	0,277	3,865	0	0	0	0	0
240	0,453	0,458	0	0,277	3,865	0	0	0	0	0
260	0,483	0,488	0	0,295	4,112	0	0	0	0	0
280	0,644	0,649	0	0,392	5,398	0	0	0	0	0
300	0,453	0,458	0	0,277	3,864	0	0	0	0	0
320	0,54	0,545	0	0,329	4,564	0	0	0	0	0
340	0,627	0,632	0	0,382	5,265	0	0	0	0	0
360	0,627	0,632	0	0,382	5,265	0	0	0	0	0
380	0,627	0,632	0	0,382	5,265	0	0	0	0	0
400	0,627	0,632	0	0,382	5,265	0	0	0	0	0
420	0,627	0,632	0	0,382	5,265	0	0	0	0	0
440	0,627	0,632	0	0,382	5,265	0	0	0	0	0
460	0,627	0,632	0	0,382	5,265	0	0	0	0	0
480	0,627	0,632	0	0,382	5,265	0	0	0	0	0
500	0,627	0,632	0	0,382	5,265	0	0	0	0	0
520	0,627	0,632	0	0,382	5,264	0	0	0	0	0
540	0,627	0,632	0	0,382	5,265	0	0	0	0	0
560	0,717	0,722	0	0,435	5,976	0	0	0	0	0
580	0,672	0,677	0	0,409	5,62	0	0	0	0	0
600	0,648	0,653	0	0,394	5,428	0	0	0	0	0
620	0,594	0,599	0	0,362	4,992	0	0	0	0	0
640	0,516	0,521	0	0,315	4,372	0	0	0	0	0

660	0,453	0,458	0	0,277	3,865	0	0	0	0	0
680	0,453	0,458	0	0,277	3,864	0	0	0	0	0
700	0,453	0,458	0	0,277	3,864	0	0	0	0	0
720	0,453	0,458	0	0,277	3,864	0	0	0	0	0
740	0,453	0,458	0	0,277	3,864	0	0	0	0	0
760	0,453	0,458	0	0,277	3,865	0	0	0	0	0
780	0,453	0,458	0	0,277	3,865	0	0	0	0	0
800	0,453	0,458	0	0,277	3,865	0	0	0	0	0
820	0,453	0,458	0	0,277	3,865	0	0	0	0	0
840	0,453	0,458	0	0,277	3,865	0	0	0	0	0
860	0,453	0,458	0	0,277	3,865	0	0	0	0	0
880	0,453	0,458	0	0,277	3,865	0	0	0	0	0
900	0,453	0,458	0	0,277	3,865	0	0	0	0	0
920	0,453	0,458	0	0,277	3,865	0	0	0	0	0
940	0,453	0,458	0	0,277	3,864	0	0	0	0	0
960	0,453	0,458	0	0,277	3,865	0	0	0	0	0
980	0,453	0,458	0	0,277	3,865	0	0	0	0	0
1000	0,453	0,458	0	0,277	3,866	0	0	0	0	0
1020	0,532	0,537	0	0,324	4,502	0	0	0	0	0
1040	0,476	0,481	0	0,291	4,056	0	0	0	0	0
1060	0,453	0,458	0	0,277	3,867	0	0	0	0	0
1080	0,453	0,458	0	0,277	3,865	0	0	0	0	0
1100	0,453	0,458	0	0,277	3,864	0	0	0	0	0
1120	0,453	0,458	0	0,277	3,864	0	0	0	0	0
1140	0,453	0,458	0	0,277	3,864	0	0	0	0	0
1160	0,453	0,458	0	0,277	3,864	0	0	0	0	0
TOTAL	589	595		360	4999					

## CUBICACION DE TIERRAS

PK	VOLUMEN (M3)						SUELO		
	DES-1	DES-2	DES-3	TERR.	DES.	TERR.	DES.	TERR.	
0	3,5	0	0	0	2,6		0	0	
20	0,8	0	0	0	2,3	0	0	0	
40	0,5	0	0	0	2,3	0	0	0	
60	0	0	0	0	2,3	0	0	0	
80	21,8	0	0	0	3,1	0	0	0	
100	12,7	0	0	0	2,9	0	0	0	

120	16,9	0	0	0	3	0	0	0
140	32,4	0	0	0	3,4	0	0	0
160	49,6	0	0	0	3,6	0	0	0
180	41,4	0	0	0	3,5	0	0	0
200	17,5	0	0	0	3	0	0	0
220	22,8	0	0	0	3,1	0	0	0
240	24	0	0	0	3,2	0	0	0
260	25,2	0	0	0	3,3	0	0	0
280	29	0	0	0	4	0	0	0
300	25,7	0	0	0	3,2	0	0	0
320	24,9	0	0	0	3,5	0	0	0
340	28	0	0	0	3,9	0	0	0
360	35,4	0	0	0	3,8	0	0	0
380	0	0	0	64,1	0	4,6	0	0
400	0	0	0	62	0	4,4	0	0
420	0	0	0	48,9	0	4,3	0	0
440	0	0	0	29,5	0	3,8	0	0
440	0	0	0	29,5	0	3,8	0	0
460	0	0	0	17,6	0	3,4	0	0
480	0,1	0	0	7	0,8	2,4	0	0
500	8,7	0	0	0	3,3	0	0	0
520	18,4	0	0	0	3,6	0	0	0
540	25,3	0	0	0	3,8	0	0	0
560	30	0	0	0	4,2	0	0	0
580	35,9	0	0	0	4,2	0	0	0
600	35,2	0	0	0	4,1	0	0	0
620	40,2	0	0	0	4	0	0	0
640	28	0	0	0	3,5	0	0	0
660	23,4	0	0	0	3,1	0	0	0
680	19,4	0	0	0	2,9	0	0	0
700	3,3	0	0	2,1	1,9	0,8	0	0
720	14,9	0	0	0	3	0	0	0
740	22,8	0	0	0	3,2	0	0	0
760	18,7	0	0	0	3,1	0	0	0
780	18,4	0	0	0	3	0	0	0
800	21,3	0	0	0	3,1	0	0	0
820	16,4	0	0	0	2,9	0	0	0
840	9,6	0	0	2,3	2,1	0,8	0	0
860	0	0	0	9,2	1	1,7	0	0
880	0	0	0	17,7	0,2	2,6	0	0
880	0	0	0	17,7	0,2	2,6	0	0
900	0	0	0	23,3	0	2,9	0	0
920	0	0	0	26,3	0	2,9	0	0
940	0,1	0	0	21,3	0,3	2,2	0	0

960	3,6	0	0	16,3	1,1	2	0	0
980	6,4	0	0	10,2	1,5	1,5	0	0
1000	4,5	0	0	2,8	1,7	1,1	0	0
1020	9,1	0	0	3,5	2,3	0,9	0	0
1040	1,1	0	0	7,6	0,7	2,2	0	0
1060	4	0	0	1	2,2	0,4	0	0
1080	2,9	0	0	0,4	2,2	0,3	0	0
1100	4,1	0	0	0,6	2,1	0,4	0	0
1120	7,6	0	0	0	2,8	0	0	0
1140	13	0	0	0	3,2	0	0	0
1160	29,4	0	0	0	3,4	0	0	0

TOTALES 17420 0 0 7470,3 2818,9 910,4 0 0

ORIGEN

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CUBICACION DE FIRMES

VOLUMEN (M3)

PK	CAPA 1	CAPA 2	CAPA 3	CAPA 4	CAPA 5	CAPA 6	CAPA 7	CAPA 8	CAPA 9	CAPA 10
0	0,278	0,283	0	0,172	2,47	0	0	0	0	0
20	0,278	0,283	0	0,172	2,465	0	0	0	0	0
40	0,278	0,283	0	0,172	2,465	0	0	0	0	0
60	0,278	0,283	0	0,172	2,465	0	0	0	0	0
80	0,278	0,283	0	0,172	2,465	0	0	0	0	0
100	0,278	0,283	0	0,172	2,464	0	0	0	0	0
120	0,278	0,283	0	0,172	2,465	0	0	0	0	0
140	0,278	0,283	0	0,172	2,465	0	0	0	0	0
160	0,278	0,283	0	0,172	2,464	0	0	0	0	0
180	0,278	0,283	0	0,172	2,464	0	0	0	0	0
200	0,278	0,283	0	0,172	2,465	0	0	0	0	0
220	0,278	0,283	0	0,172	2,465	0	0	0	0	0
240	0,278	0,283	0	0,172	2,465	0	0	0	0	0
TOTAL	67	68		41	592					

## CUBICACION DE TIERRAS

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## CUBICACION DE FIRMES

PK	VOLUMEN (M3)			SUELO				
	DESM-1	DESM-2	DESM-3	TERR.	DESM.	TERR	DESM.	TERR
0	3,4	0	0	0	1,9		0	0
	34,1	0	0	16,5	23,8	10,7	0	0
20	0	0	0	1,7	0,4	1,1	0	0
	0	0	0	37,6	8,2	22,4	0	0
40	0	0	0	2,1	0,4	1,2	0	0
	0,8	0	0	29,5	13,6	17,6	0	0
60	0,1	0	0	0,8	1	0,6	0	0
	1,7	0	0	15,1	19,6	11,9	0	0
80	0,1	0	0	0,7	1	0,6	0	0
	26,7	0	0	6,7	28,6	6,1	0	0
100	2,6	0	0	0	1,9	0	0	0
	106,4	0	0	0	40	0	0	0
120	8,1	0	0	0	2,1	0	0	0
	197,5	0	0	0	43,7	0	0	0
140	11,7	0	0	0	2,3	0	0	0
	258,9	0	0	0	46,2	0	0	0
160	14,2	0	0	0	2,4	0	0	0
	331,6	0	0	0	48,9	0	0	0
180	18,9	0	0	0	2,5	0	0	0
	396,3	0	0	0	50,9	0	0	0
200	20,7	0	0	0	2,6	0	0	0
	435,4	0	0	0	52,8	0	0	0
220	22,9	0	0	0	2,7	0	0	0
	430,5	0	0	0	52,7	0	0	0
240	20,2	0	0	0	2,6	0	0	0
TOTALES ORIGEN	2219,9	0	0	105,4	429,1	68,7	0	0

PK	VOLUMEN (M3)									
	CAPA 1	CAPA 2	CAPA 3	CAPA 4	CAPA 5	CAPA 6	CAPA 7	CAPA 8	CAPA 9	CAPA 10
0	0,278	0,283	0	0,172	2,47	0	0	0	0	0
20	0,278	0,283	0	0,172	2,465	0	0	0	0	0
40	0,278	0,283	0	0,172	2,465	0	0	0	0	0
60	0,278	0,283	0	0,172	2,465	0	0	0	0	0
80	0,278	0,283	0	0,172	2,465	0	0	0	0	0
100	0,278	0,283	0	0,172	2,464	0	0	0	0	0
120	0,278	0,283	0	0,172	2,465	0	0	0	0	0
140	0,278	0,283	0	0,172	2,465	0	0	0	0	0
160	0,278	0,283	0	0,172	2,464	0	0	0	0	0
180	0,278	0,283	0	0,172	2,464	0	0	0	0	0
200	0,278	0,283	0	0,172	2,464	0	0	0	0	0
220	0,278	0,283	0	0,172	2,464	0	0	0	0	0
TOTAL	61	62		38	542					

## CUBICACION DE TIERRAS

PK	VOLUMEN (M3)			SUELO				
	DESM-1	DESM-2	DESM-3	TERR.	DESM.	TERR	DESM.	TERR
0	4,7	0	0	0	2		0	0
20	0	0	0	9,4	0	2	0	0
40	0	0	0	25,5	0	2,7	0	0
60	0	0	0	35,1	0	3,1	0	0
80	0	0	0	48	0	3,5	0	0
100	0	0	0	39,7	0	3,4	0	0
120	0	0	0	46,9	0	3,3	0	0
140	1,6	0	0	4,7	0,6	1,5	0	0
160	11,6	0	0	0	2,3	0	0	0
180	13,7	0	0	0	2,4	0	0	0
200	18,7	0	0	0	2,5	0	0	0
220	19,3	0	0	0	2,6	0	0	0
TOTALES ORIGEN	1151,7	0	0	4187,5	199,7	388,4	0	0

o e3

## CUBICACION DE FIRMES

PK	VOLUMEN (M3)									
	CAPA 1	CAPA 2	CAPA 3	CAPA 4	CAPA 5	CAPA 6	CAPA 7	CAPA 8	CAPA 9	CAPA 10
0	0,278	0,283	0	0,172	2,47	0	0	0	0	0
20	0,278	0,283	0	0,172	2,465	0	0	0	0	0
40	0,278	0,283	0	0,172	2,464	0	0	0	0	0
60	0,278	0,283	0	0,172	2,464	0	0	0	0	0
80	0,278	0,283	0	0,172	2,465	0	0	0	0	0
TOTAL	22	23		14	197					

## CUBICACION DE TIERRAS

PK	VOLUMEN (M3)			SUELO				
	DESM-1	DESM-2	DESM-3	TERR.	DESM.	TERR.	DESM.	TERR.
0	3,3	0	0	0	1,9	0	0	0
20	12,7	0	0	0	2,3	0	0	0
40	6,8	0	0	0	2,1	0	0	0
60	9,8	0	0	0	2,2	0	0	0
80	6	0	0	1	1,6	0,6	0	0
TOTALES ORIGEN	679,3	0	0	9,7	166,7	5,8	0	0

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## CUBICACION DE FIRMES

PK	VOLUMEN (M3)									
	CAPA 1	CAPA 2	CAPA 3	CAPA 4	CAPA 5	CAPA 6	CAPA 7	CAPA 8	CAPA 9	CAPA 10
0	0,453	0,458	0	0,277	3,87	0	0	0	0	0
20	0,453	0,458	0	0,277	3,865	0	0	0	0	0
40	0,453	0,458	0	0,277	3,864	0	0	0	0	0
60	0,502	0,507	0	0,307	4,266	0	0	0	0	0
TOTAL	28	28		17	236					

## CUBICACION DE TIERRAS

PK	VOLUMEN (M3)			SUELO				
	DESM-1	DESM-2	DESM-3	TERR.	DESM.	TERR.	DESM.	TERR.
0	4,3	0	0	0	2,6	0	0	0
20	0	0	0	2,6	0,9	1,4	0	0
40	0,1	0	0	0,8	1,6	0,7	0	0
60	4,3	0	0	0	2,8	0	0	0
TOTALES ORIGEN	87,6	0	0	68,9	105	40,9	0	0

