





# Anders Engberg

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Office for planning and mapping

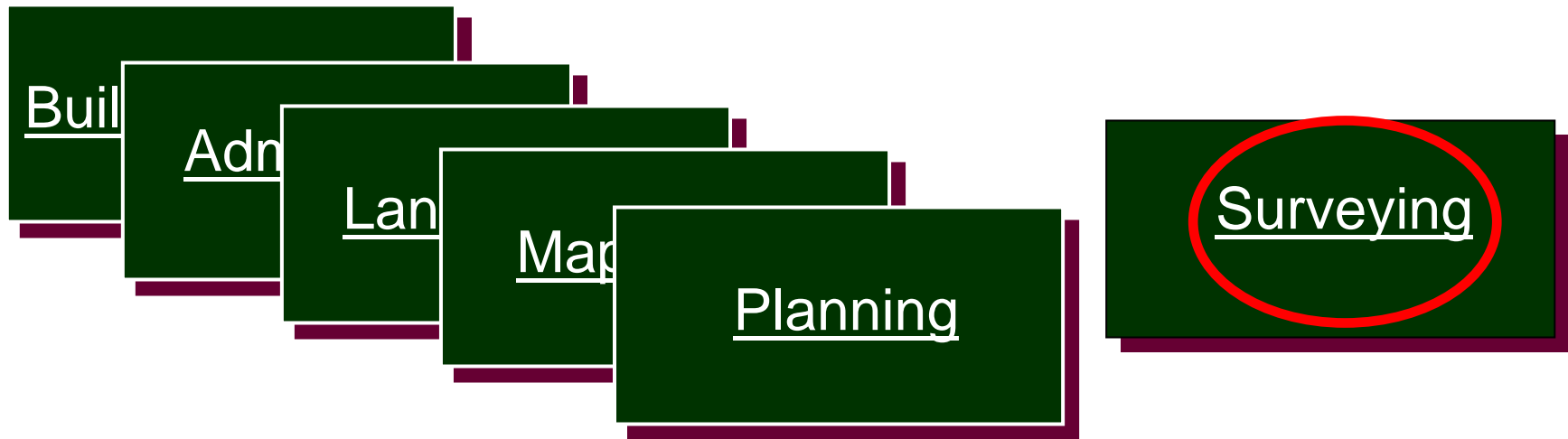






Fig. 1. Envåningstorn.



Fig. 2. Torn med centralträd.



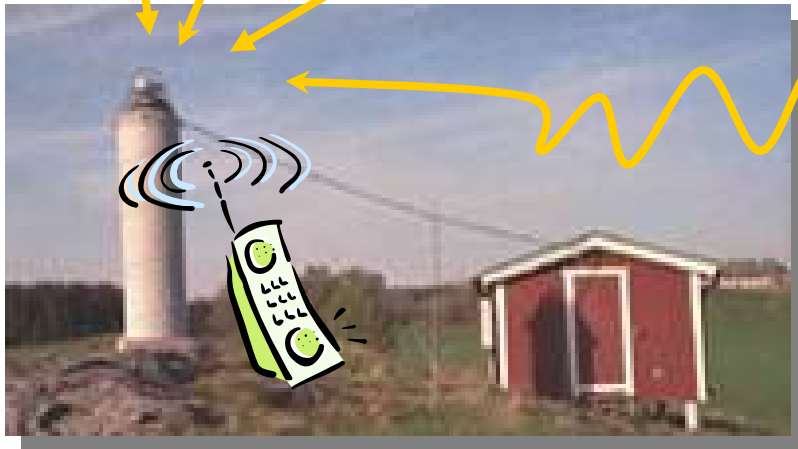
# Development



Fig. 2. Torn med centralträd.



# Is GNSS-technique the solution of everything?





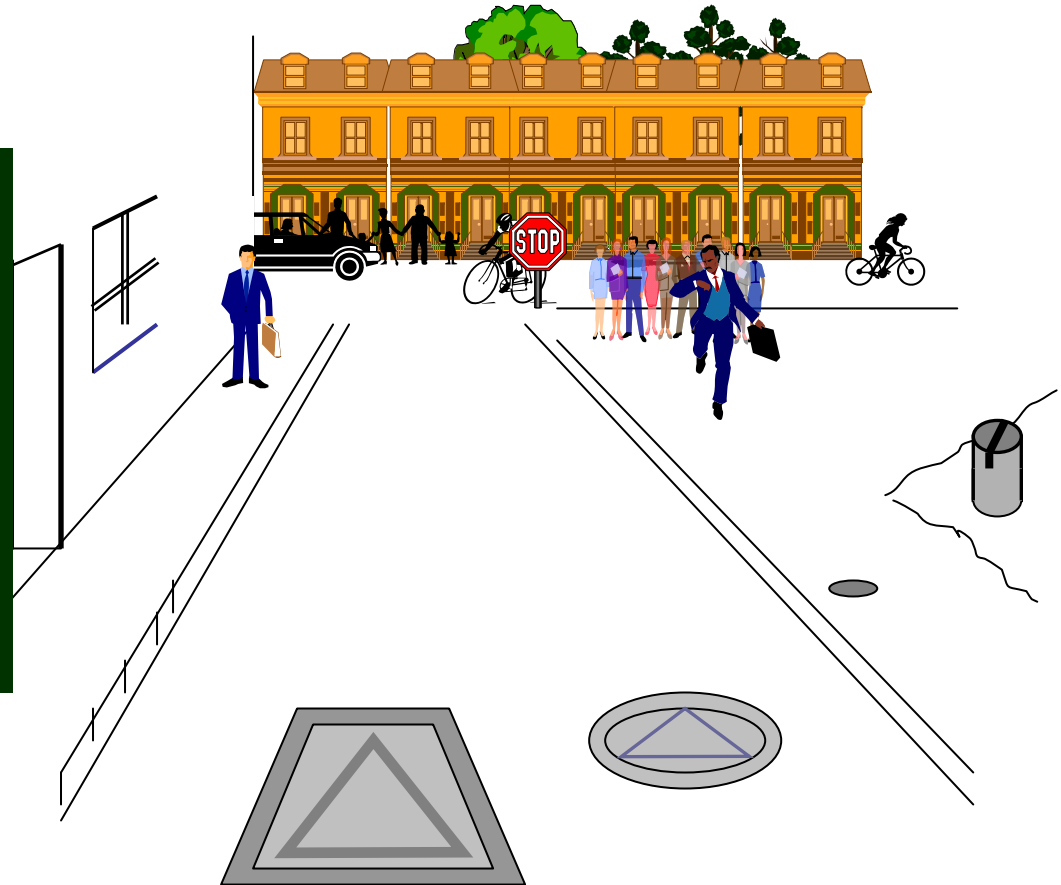
# Where are the reference points?



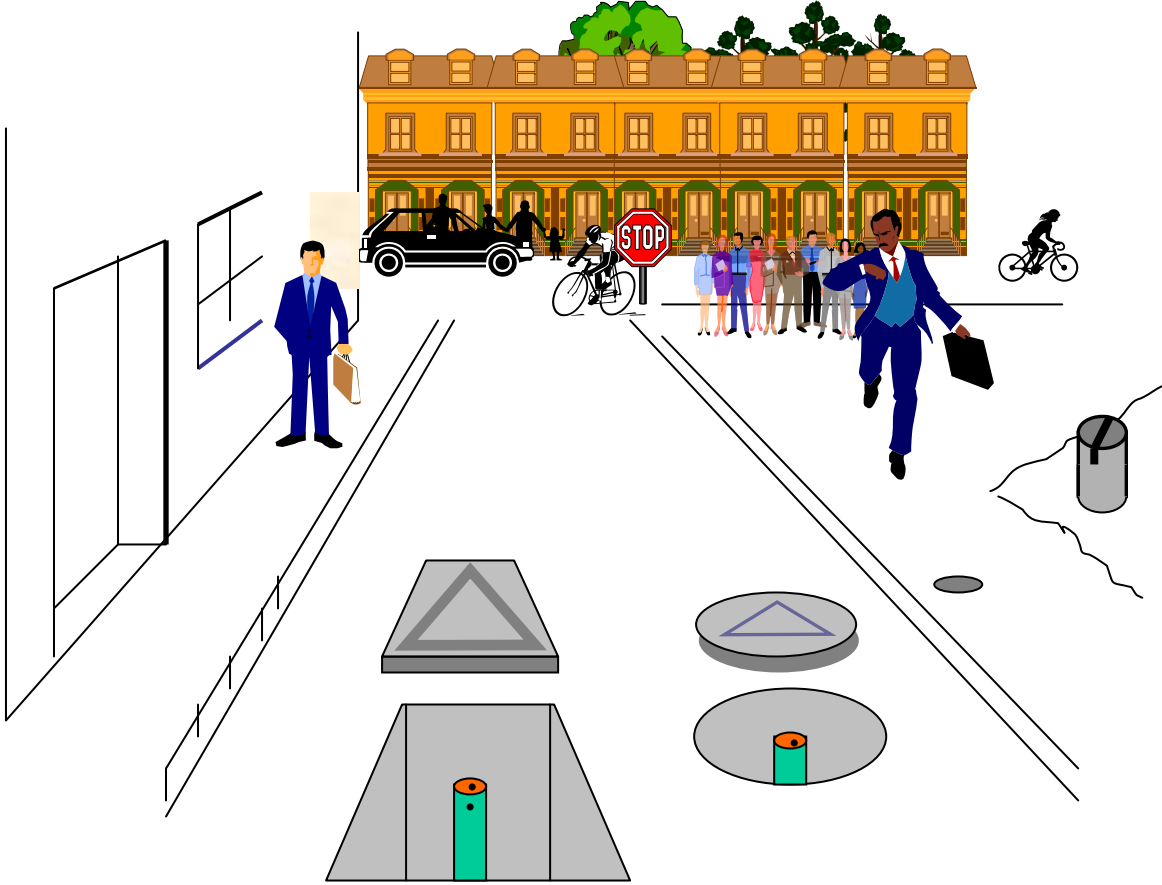
# Where are the reference points?

Numer of reference  
points in Borås

approximately  
11000 points

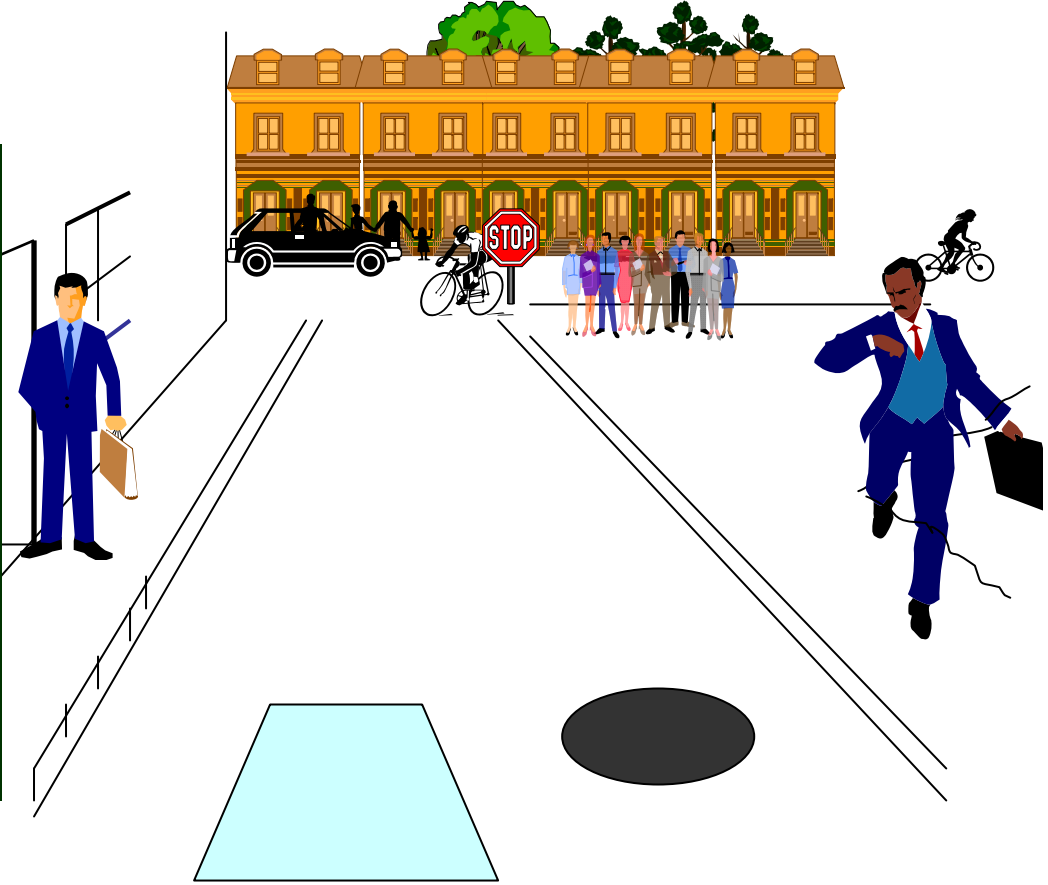


# Where are the reference points?



# Where are the reference points?

Problems?  
unsuitable position  
deep points filled with  
water or ice





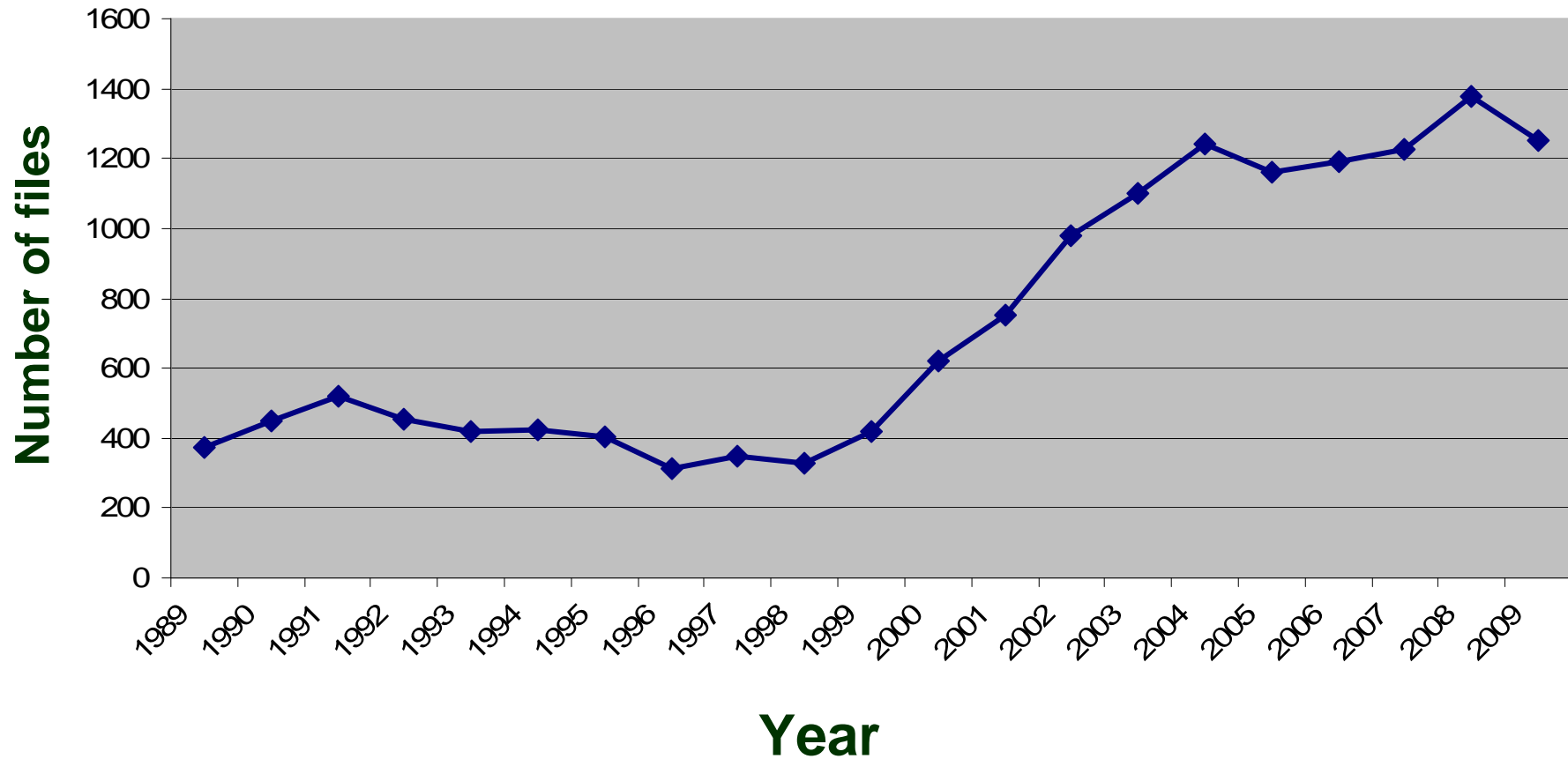






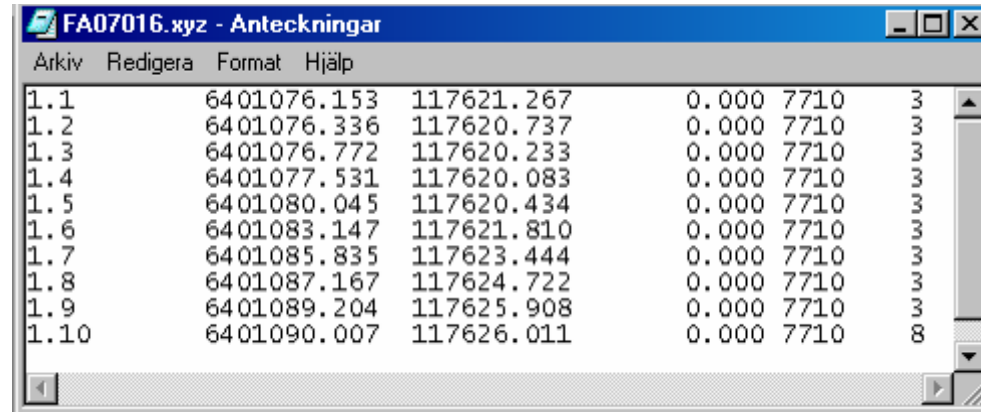


# Statistics, number of field data files



# What is a field data file?

...for example, control surveying of stake out buildings



FA07016.xyz - Anteckningar

Arkiv Redigera Format Hjälp

1.1	6401076.153	117621.267	0.000	7710	3
1.2	6401076.336	117620.737	0.000	7710	3
1.3	6401076.772	117620.233	0.000	7710	3
1.4	6401077.531	117620.083	0.000	7710	3
1.5	6401080.045	117620.434	0.000	7710	3
1.6	6401083.147	117621.810	0.000	7710	3
1.7	6401085.835	117623.444	0.000	7710	3
1.8	6401087.167	117624.722	0.000	7710	3
1.9	6401089.204	117625.908	0.000	7710	3
1.10	6401090.007	117626.011	0.000	7710	8





# What is a field data file?

...for example, reciving satellite data



FA17003.prn - Anteckningar							
Arkiv Redigera Format Hjälp							
1	6397991.821	110584.423	0.000	2210	3		
				000	3		
				13	3		
				2210	3		
				000	7		
				2210	3		
				15	3		
				2220	3		
				000	3		
				2220	3		
				000	8		
				2220	3		
				000	3		
				2220	3		
29	6398152.749	110748.955	0.000	2220	3		
	6398155.251	110751.532	0.000	2220	3		
	6398153.268	110753.458	0.000	2220	8		
	6398145.910	110770.225	0.000	2250	3		
	6398150.074	110774.717	0.000	2250	3		
	6398144.460	110780.001	0.000	2250	3		
	6398140.320	110775.548	0.000	2250	8		
53	6398139.960	110775.890	0.000	2250	3		
54	6398142.044	110778.107	0.000	2250	3		
55	6398134.474	110785.396	0.000	2250	3		
56	6398132.333	110783.195	0.000	2250	8		
57	6398131.348	110784.134	0.000	2250	3		
58	6398133.409	110786.351	0.000	2250	3		
59	6398125.768	110793.679	0.000	2250	3		
60	6398123.664	110791.480	0.000	2250	8		
61	6398122.666	110792.433	0.000	2250	3		
62	6398124.739	110794.640	0.000	2250	3		
63	6398117.172	110801.938	0.000	2250	3		
64	6398114.990	110799.764	0.000	2250	8		
65	6398113.963	110800.754	0.000	2250	3		
66	6398116.078	110802.904	0.000	2250	3		
67	6398108.451	110810.257	0.000	2250	3		
68	6398106.301	110808.053	0.000	2250	8		
69	6397887.840	110685.160	0.000	2250	3		
91	6397885.651	110687.336	0.000	2250	3		
92	6397892.975	110694.936	0.000	2250	3		
93	6397895.153	110692.824	0.000	2250	8		
94	6397896.145	110693.862	0.000	2250	3		
95	6397893.948	110696.031	0.000	2250	3		
96	6397901.194	110703.634	0.000	2250	3		
97	6397903.453	110701.525	0.000	2250	8		
98	6397904.429	110702.548	0.000	2250	3		
99	6397902.219	110704.714	0.000	2250	3		
100	6397909.477	110712.329	0.000	2250	3		
101	6397911.734	110710.193	0.000	2250	8		
102	6397912.701	110711.210	0.000	2250	3		
103	6397910.508	110713.368	0.000	2250	3		
104	6397917.823	110720.999	0.000	2250	3		
105	6397920.031	110718.869	0.000	2250	8		
106	6397920.347	110719.196	0.000	2250	3		
107	6397915.877	110723.401	0.000	2250	3		
108	6397921.130	110729.037	0.000	2250	3		
109	6397925.646	110724.777	0.000	2250	8		
110	6397938.808	110738.566	0.000	2250	3		
115	6397937.177	110740.168	0.000	2250	3		
116	6397939.730	110742.847	0.000	2250	3		
117	6397941.391	110741.275	0.000	2250	8		
118	6398144.023	110772.080	189.249	2255	3		
46	6398147.959	110776.278	189.245	2255	3		
47							

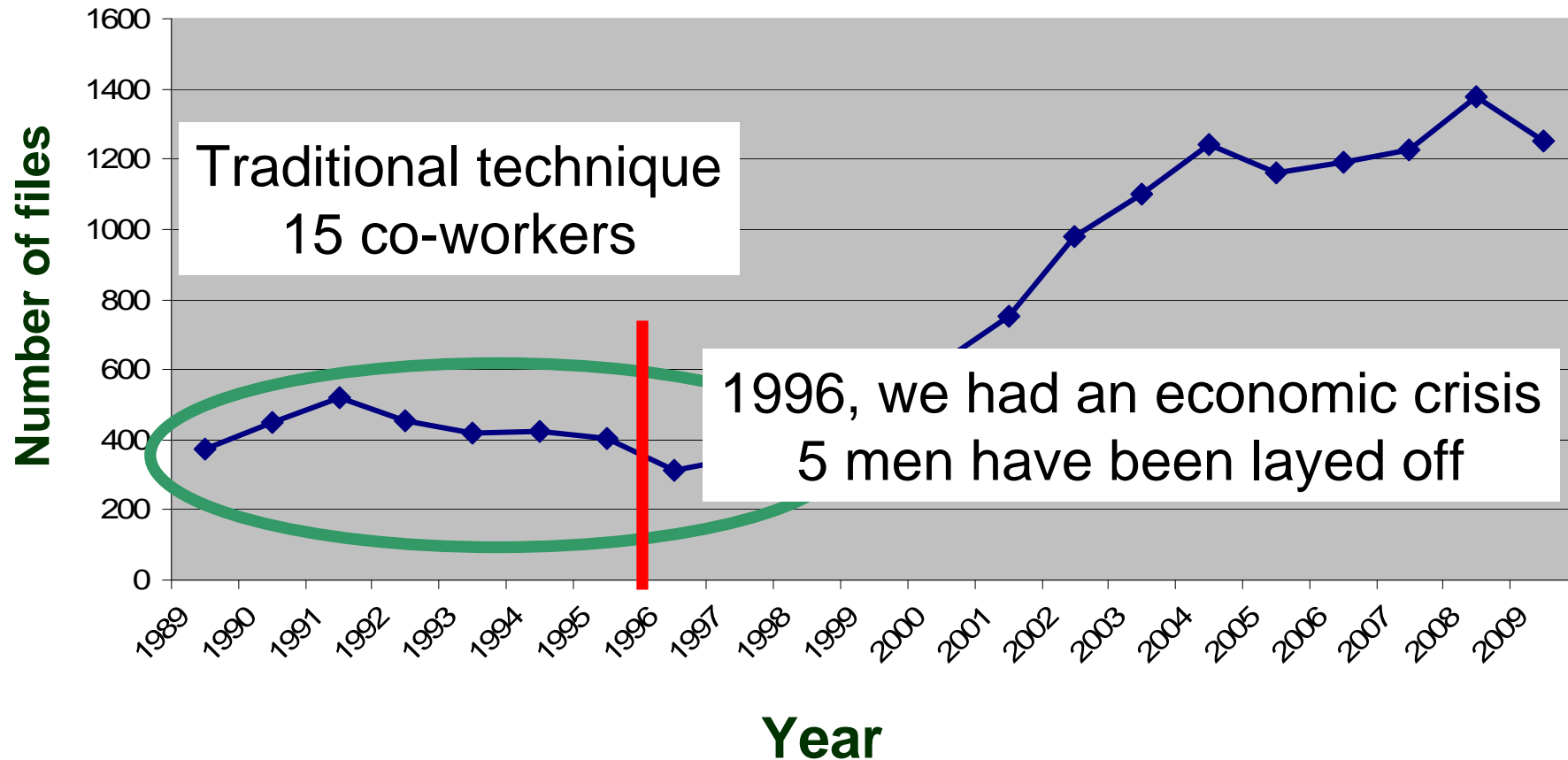
# What is a field data file?

...for example, collect surveying data for mapping

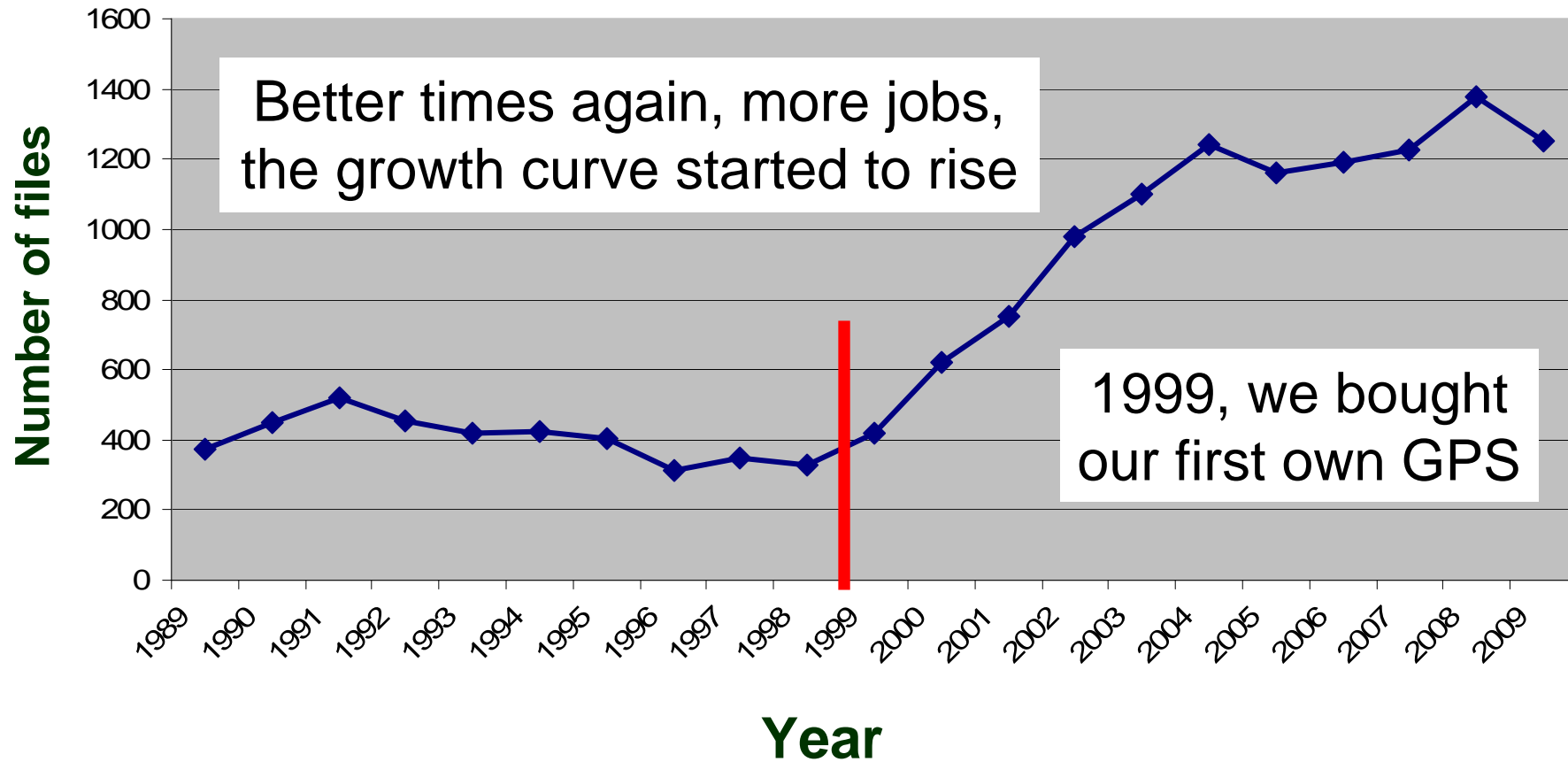


FA17006.prn - Anteckningar						
Arkiv Redigera Format Hjälp						
1	6396101.733	116389.576	160.896	2710	0	
			118	2710	0	
			795	2710	0	
			342	2710	0	
			377	2710	0	
			122	2710	0	
			356	2710	0	
			158	2710	0	
			130	2710	0	
10	6395945.161	116265.667	165.697	2710	0	
			6.199	2710	0	
			6.650	2710	0	
			7.144	2710	0	
			7.661	2710	0	
			8.222	2710	0	
16	6395839.869	116196.812	168.682	2710	0	
17	6395821.915	116184.873	169.164	2710	0	
18	6395803.635	116172.775	169.600	2710	0	
19	6395785.058	116160.521	169.964	2710	0	
20	6395766.165	116148.195	170.269	2710	0	
21	6395747.104	116135.788	170.565	2710	0	
22	6395727.975	116123.240	170.769	2710	0	
23	6395708.722	116110.467	170.901	2710	0	
24	6395688.994	116097.513	170.960	2710	0	
25	6395669.032	116084.480	170.989	2710	0	
26	6395649.017	116071.398	170.973	2710	0	
27	6395628.991	116058.203	170.842	2710	0	
28	6395608.746	116044.980	170.539	2710	0	
29	6395588.336	116031.593	170.424	2710	0	
30	6395567.688	116018.007	170.071	2710	0	
31	6395546.976	116004.431	169.685	2710	0	
32	6395530.360	115993.302	169.288	2710	0	
33	6395509.756	115979.333	168.770	2710	0	
34	6395489.340	115965.377	168.214	2710	0	
35	6395469.157	115951.051	167.561	2710	0	
36	6395449.108	115936.249	166.810	2710	0	
37	6395433.205	115924.088	166.217	2710	0	
38	6395417.371	115911.581	165.509	2710	0	
39	6395401.608	115898.848	164.772	2710	0	
40	6395386.090	115885.935	164.087	2710	0	
41	6395370.866	115872.733	163.255	2710	0	
42	6395355.858	115859.284	162.491	2710	0	
43	6395340.876	115845.683	161.656	2710	0	
44	6395016.376	115488.736	148.955	2710	0	
45	6395003.034	115473.285	148.950	2710	0	
46	6394987.383	115456.919	148.923	2710	0	
47	6394972.041	115442.623	148.902	2710	0	
48	6394954.616	115427.947	148.988	2710	0	
49	6394937.814	115415.167	149.041	2710	0	
50	6394920.303	115403.098	149.126	2710	0	
51	6394901.846	115391.625	149.195	2710	0	
52	6394882.259	115380.574	149.276	2710	0	
53	6394861.583	115370.207	149.375	2710	0	
54	6394839.995	115360.935	149.468	2710	0	
55	6394821.310	115353.843	149.533	2710	0	
56	6394801.948	115347.553	149.588	2710	0	
57	6394781.934	115341.944	149.665	2710	0	
58	6394761.725	115337.282	149.706	2710	0	

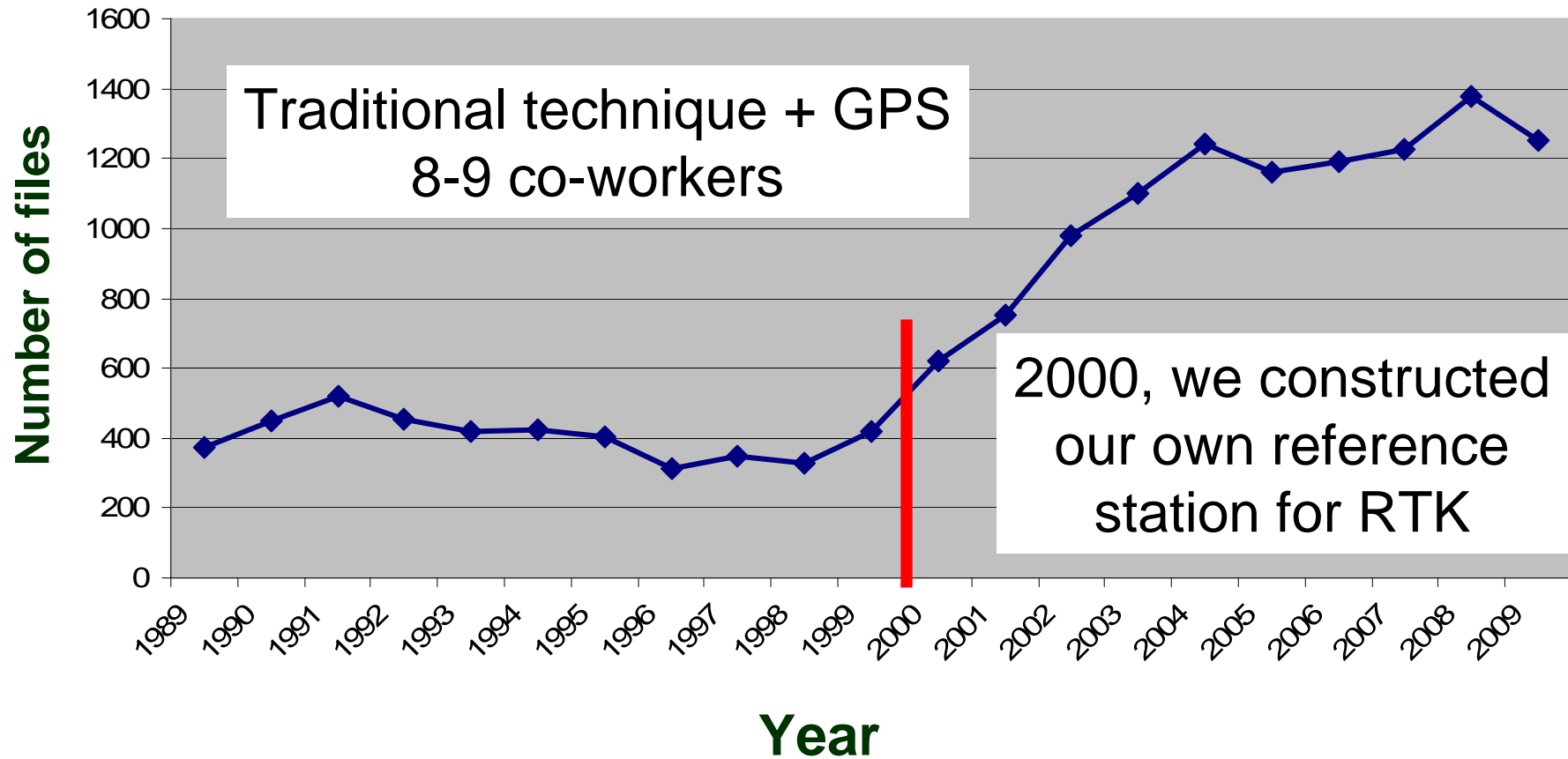
# Statistics, number of field data files



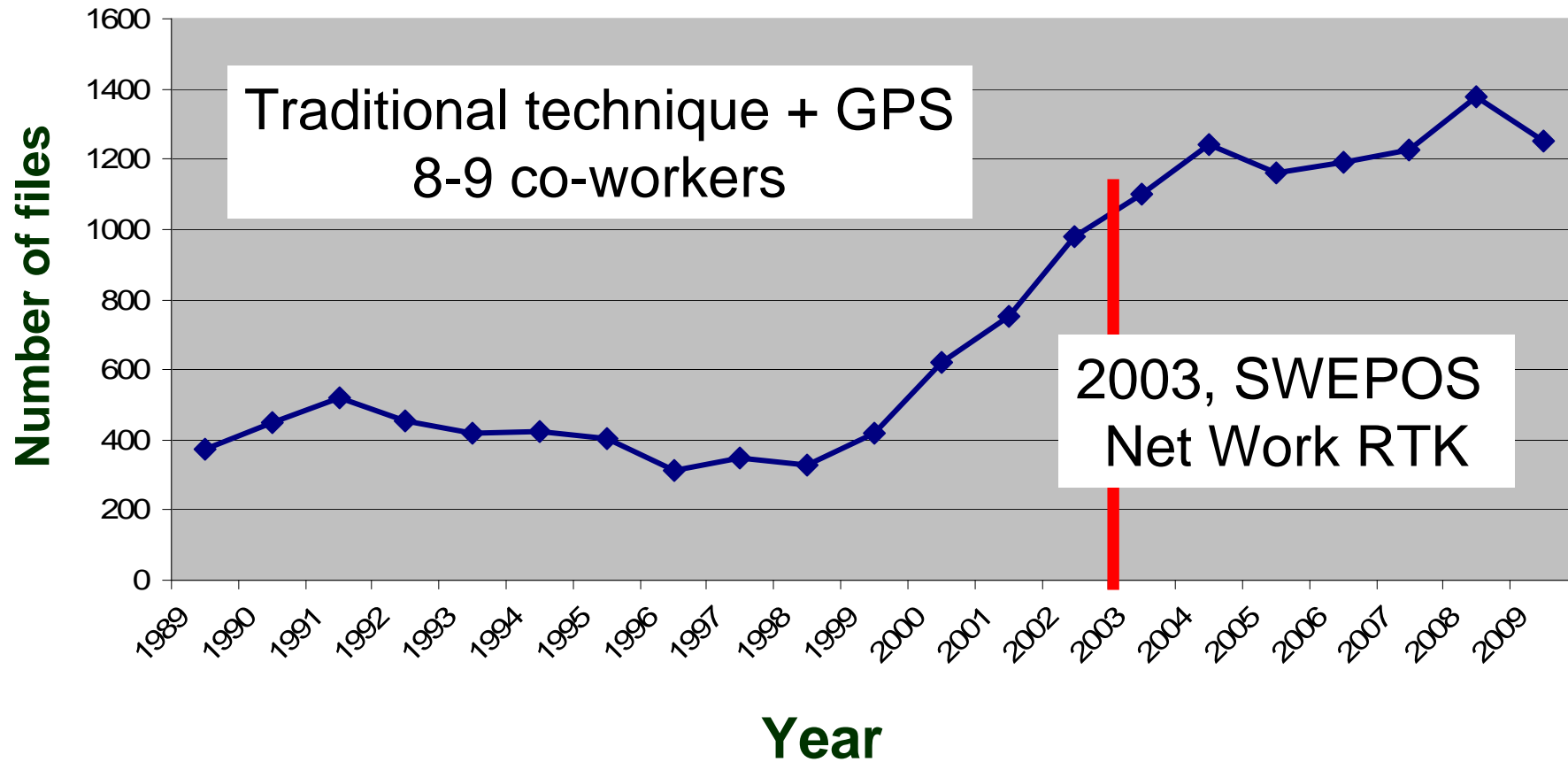
# Statistics, number of field data files



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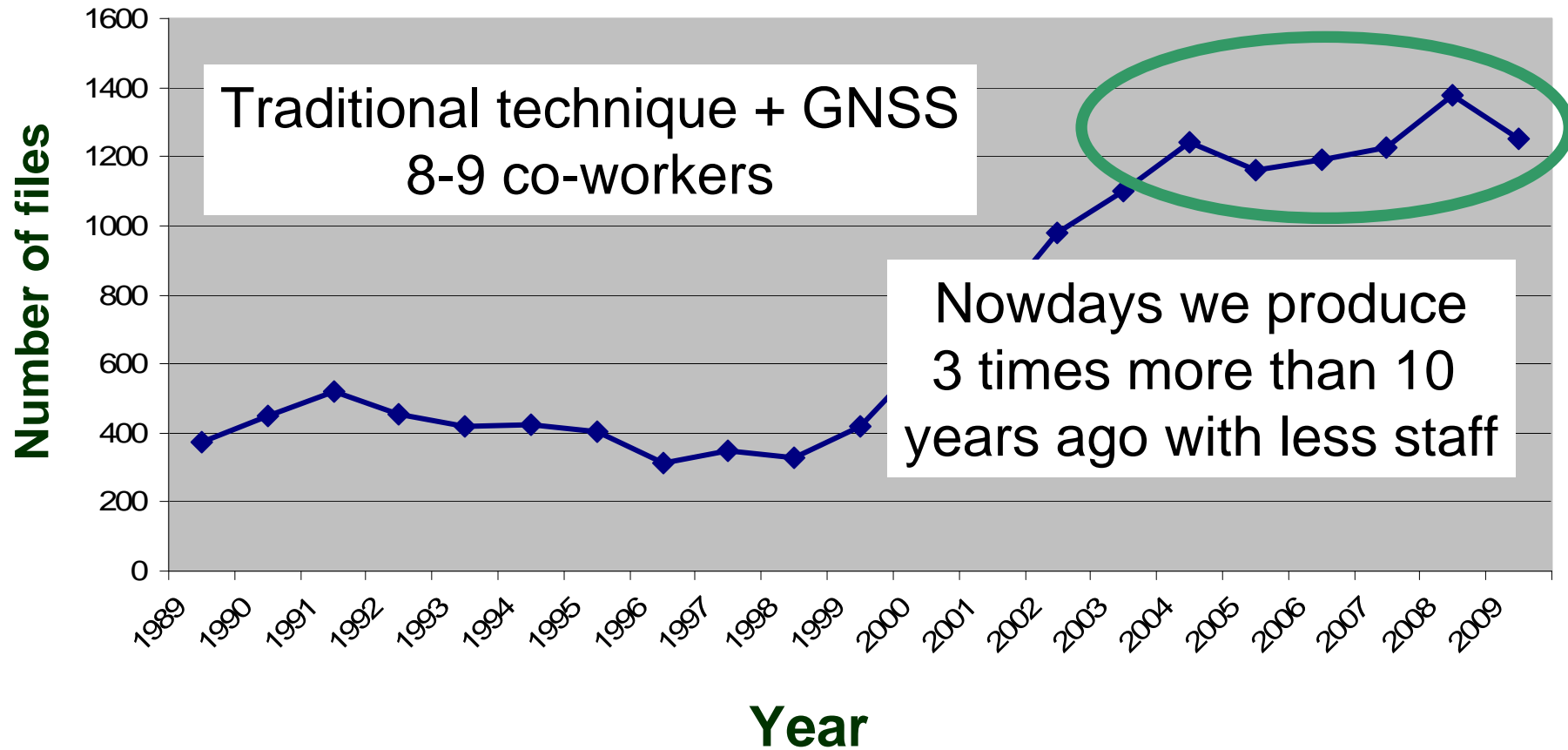


# Statistics, number of field data files





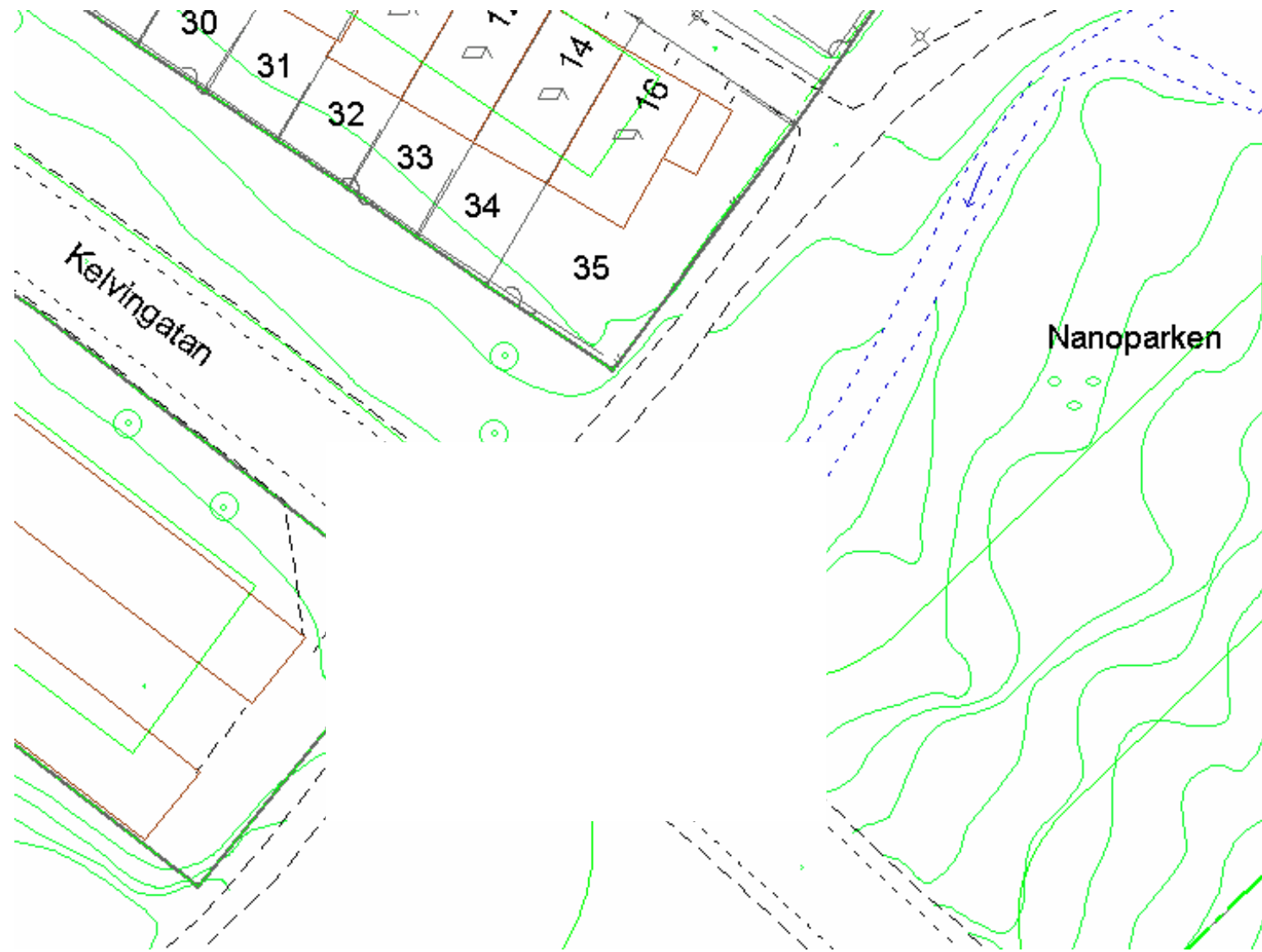
# Statistics, number of field data files

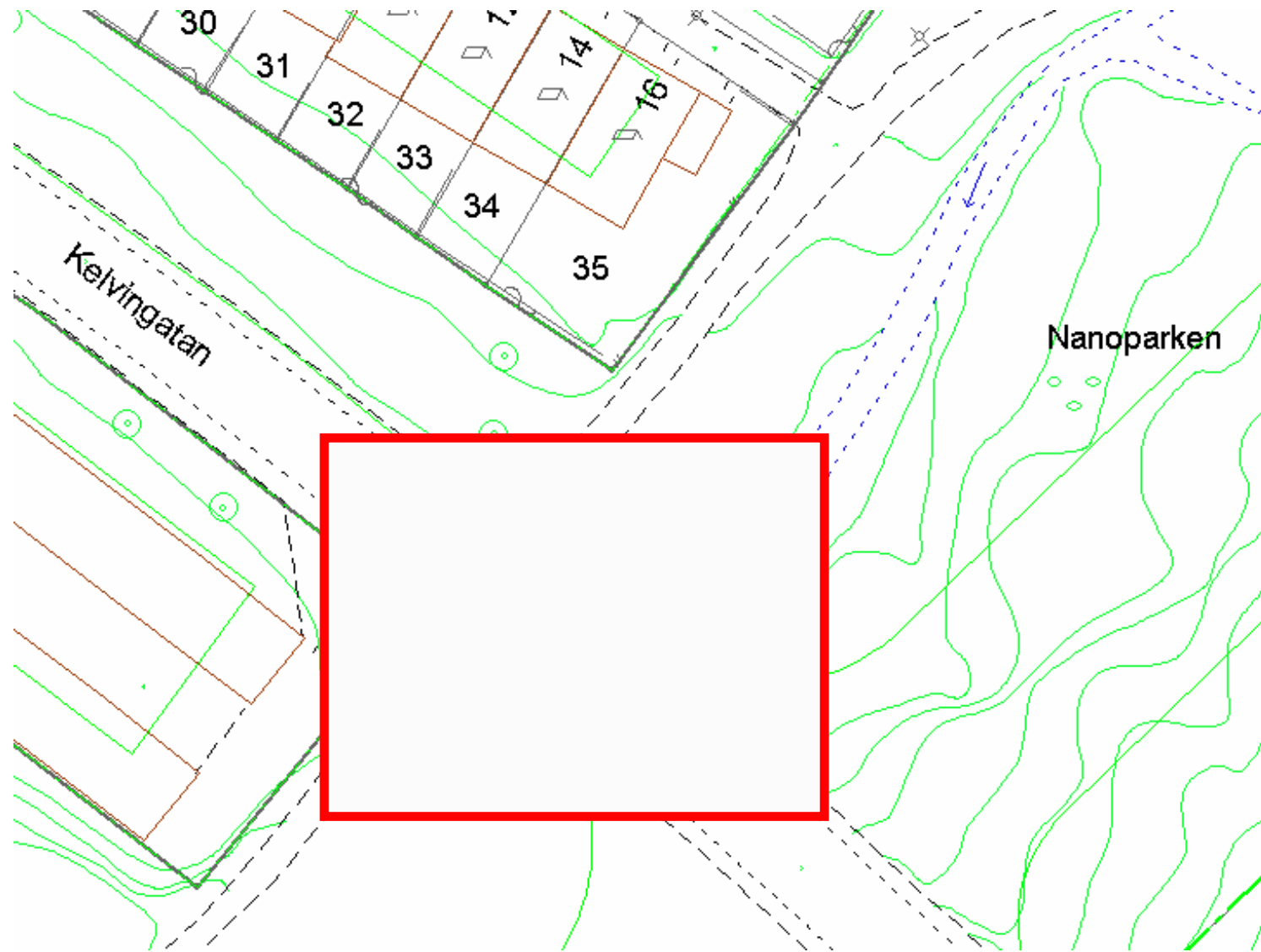


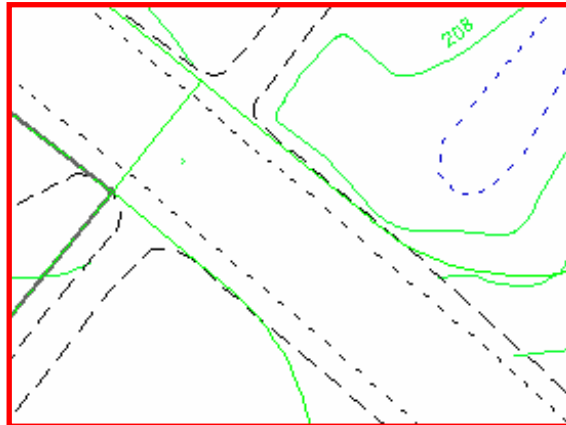


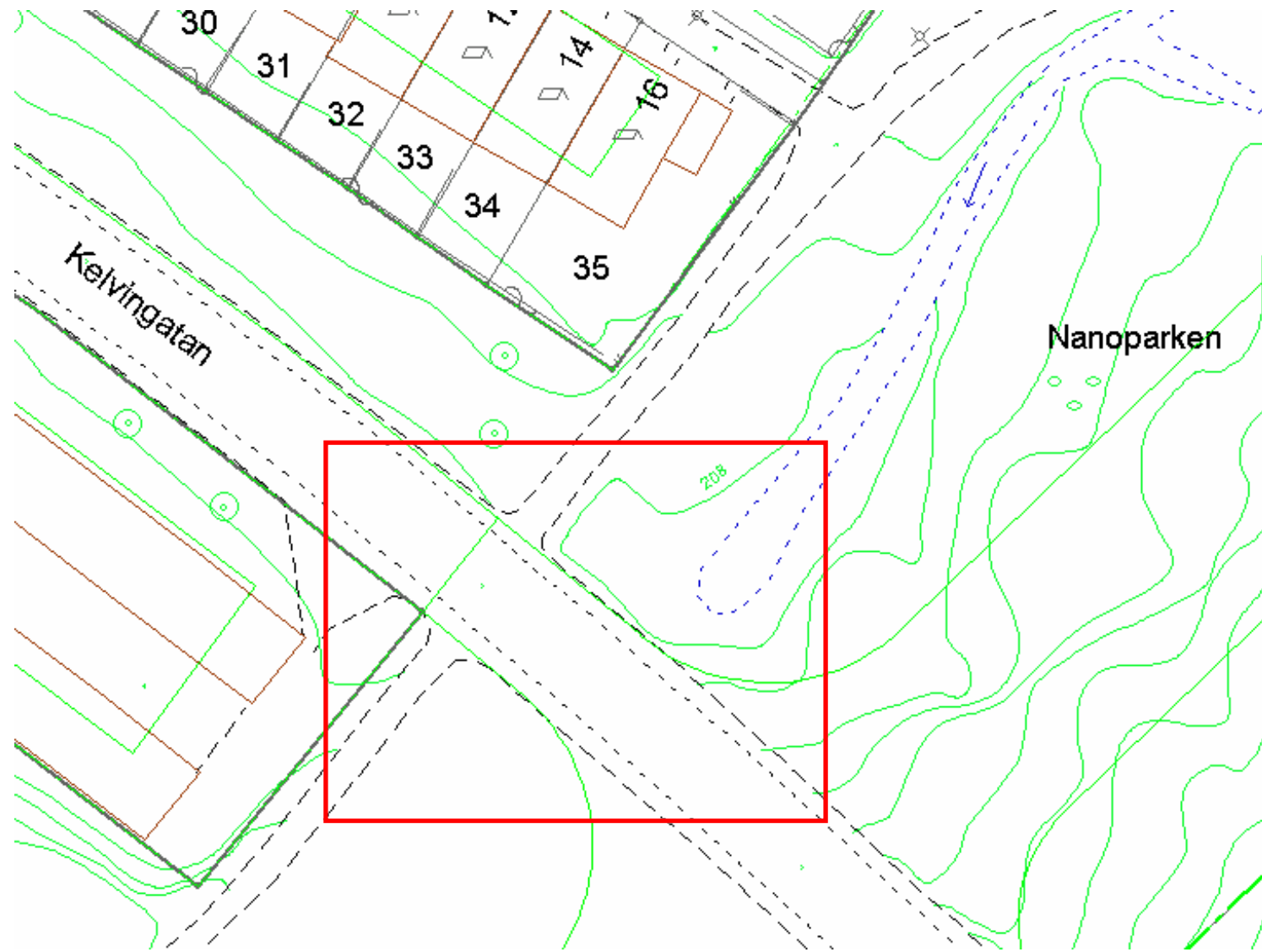


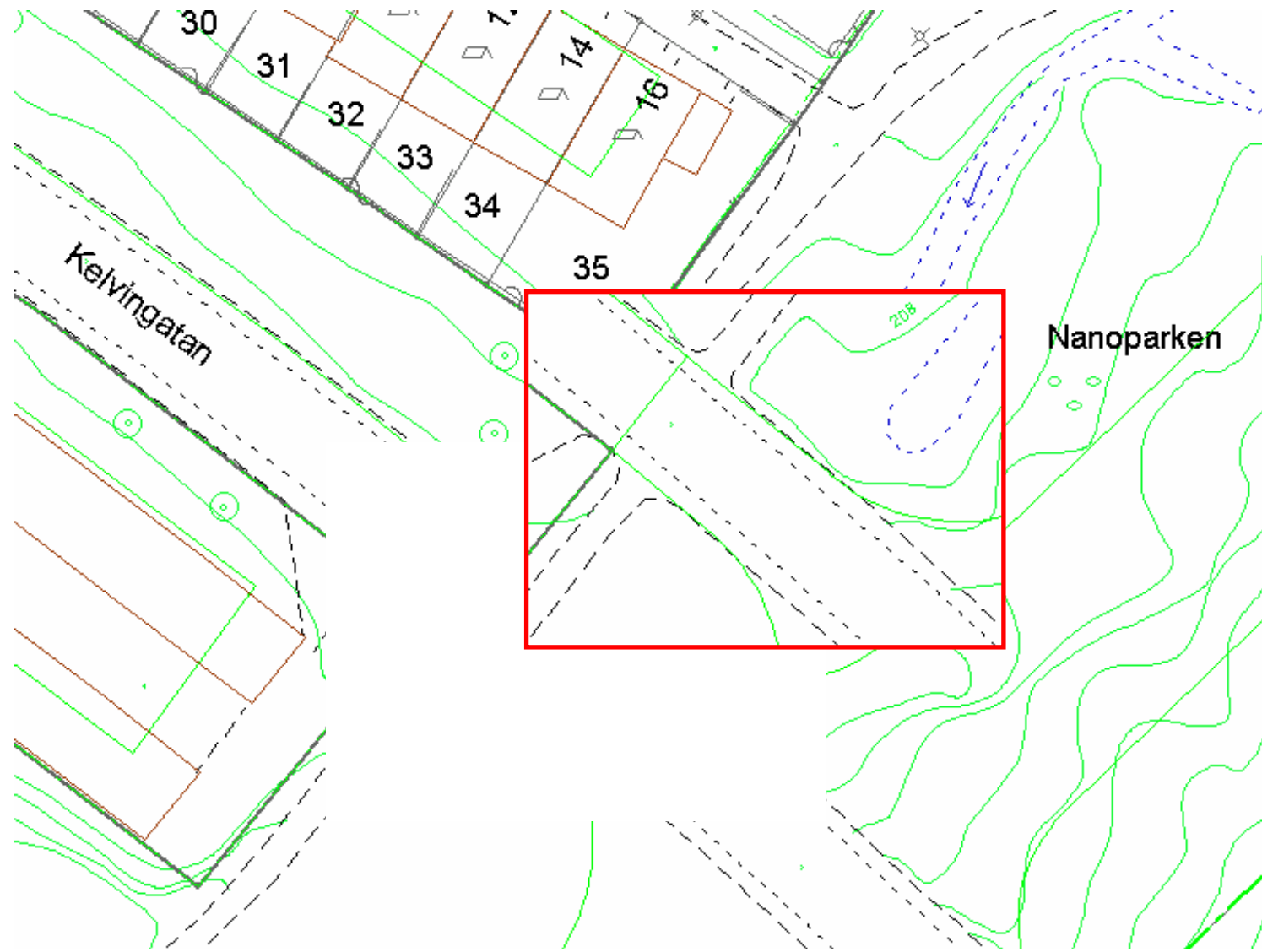
I used my GPS...



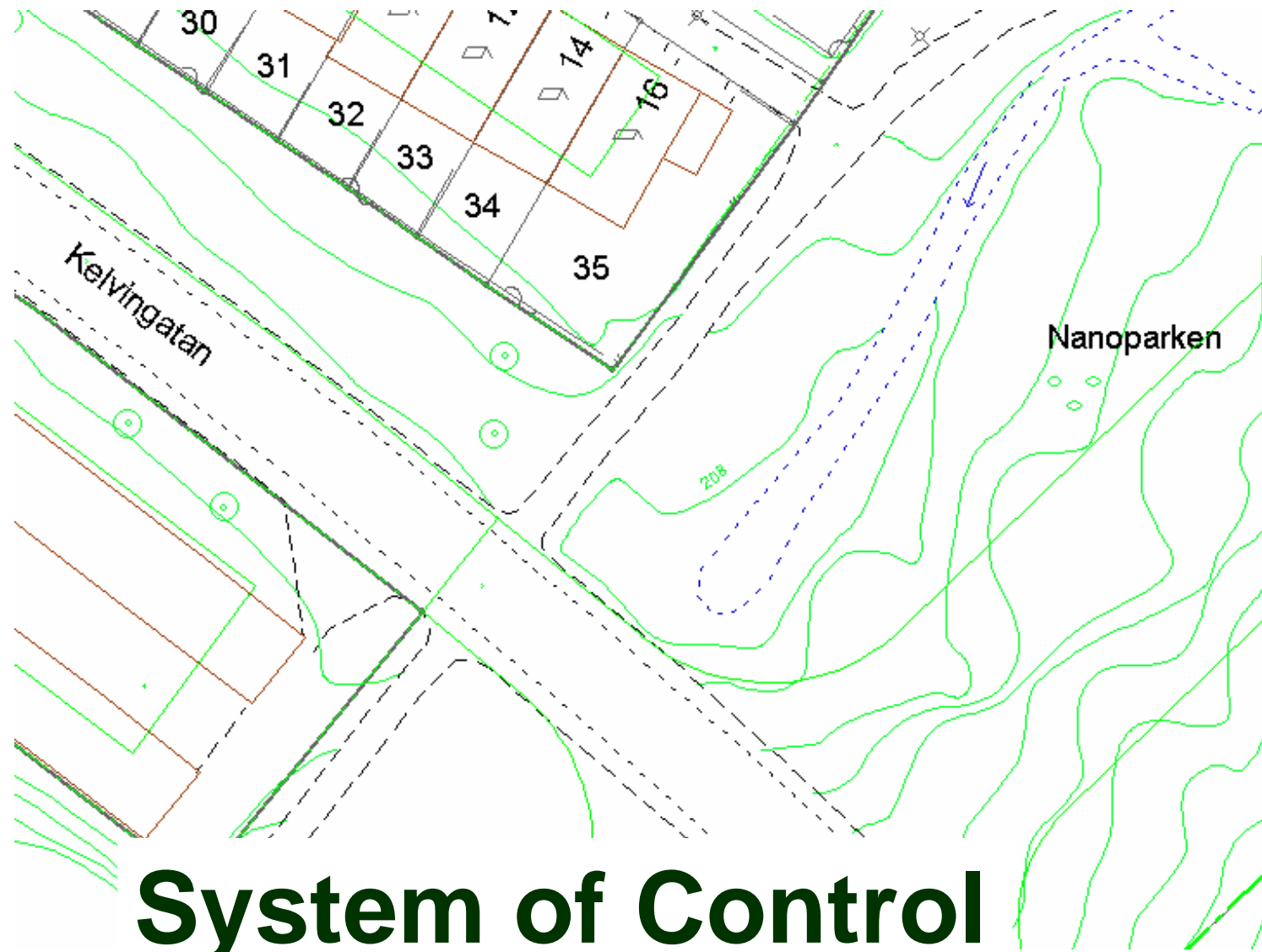




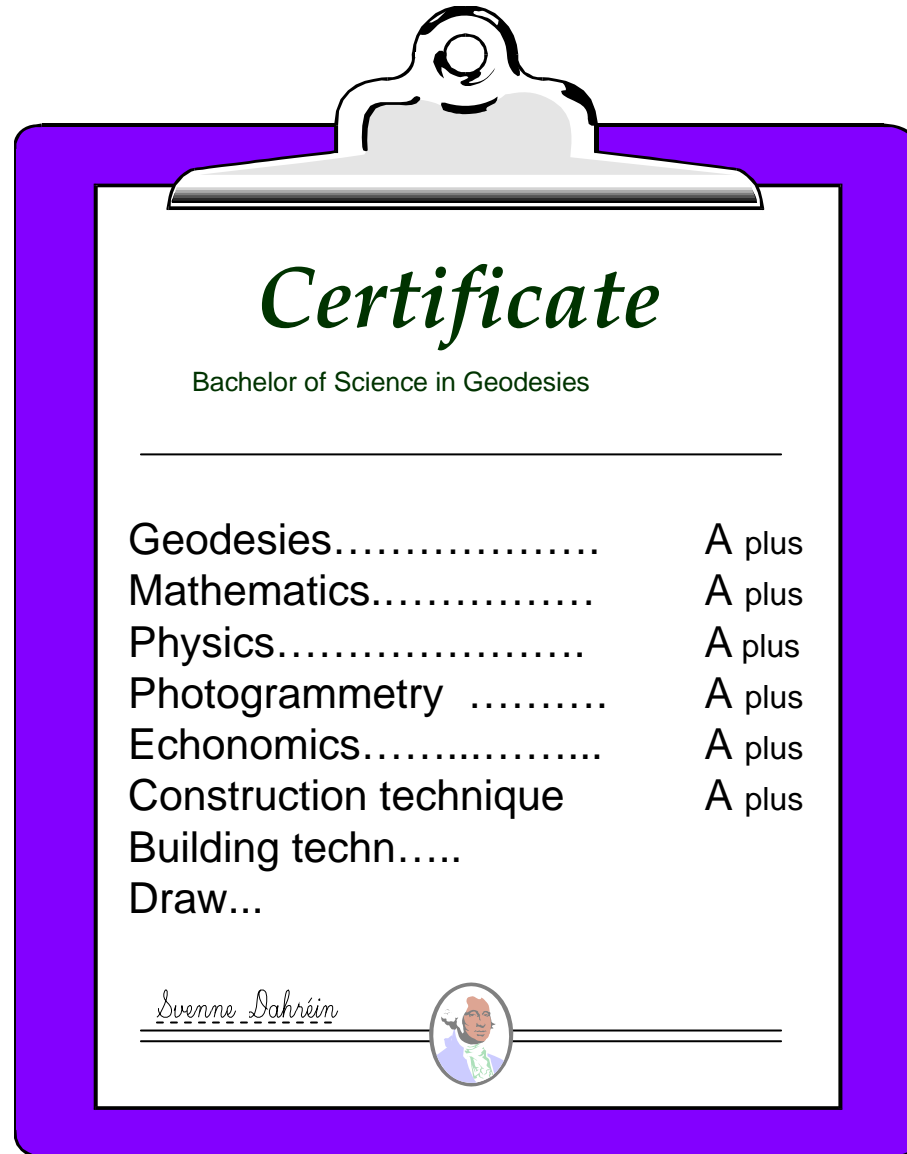








# System of Control





**...surveyors must be  
able to judge  
what is reasonable ...**





# Compare to a cash dispenser...

# Questions??

