

Table 1. Relevant information of the four studied districts

	Case study districts				Other district		
	District 2	District 3	District 6	District 7	District 4	References	
Area (km²)	48.2	29.4	21.5	15.4	61.4	[33, 45-47]	
Pop.	Census 1996	458089	259019	220331	300212	663166	[33, 45]
	Census 2011	632917	314112	229980	309745	861280	
Green area (km²)	6.8	3.9	2.8	0.8	7.7	[33, 45, 47-49]	
Medical services	418	368	577	254	277	[33, 45]	
Police stations	35	39	78	52	67	[33, 49]	
Fire stations	4	4	2	2	5	[33, 49, 50]	
Schools	735	586	795	431	627	[49]	
Level of urban development (%)	77.94	89.96	9.91	72.48	59.79	[48, 49]	
Damaged buildings proportion (%)	11.1	16.4	12.7	12.8	13.8	[33]	
Causalities (%)	0.1	0.2	0.2	0.2	0.2	[33]	

Table 2. Coefficients and parameters of each indicator

Indicator	Unit	X _{max}	X _{min}	C	K	P	Shape	References
I1. Land Price	IRR/m ²	1.2·10 ⁸	2.4·10 ⁷	1.2·10 ⁷	0.001	2	DCx	[33, 56]
I2. Cost of site preparation	IRR/m ²	40000	0	3.2·10 ⁴	0.2	2.5	DCx	[57]
I3. Access	pts.	1	0	0.35	0.2	3	IS	[45, 58]
I4. Population Coverage	m/pop	3.00	0.3	0.3	0.3	0.9	DCv	[33, 49, 59-61]
I5. Distance from Source of Danger	m	2000	0	750	0.2	4.5	IS	[39, 62, 63]
I6. Property and Land Use Zoning	pts.	1	0	1.5	1	5	ICx	[33]
I7. Neighbourhood Acceptability	pts.	1	0	0.3	0.2	3	IS	[33, 49, 64]
I8. Respect for the Environment	pts.	1	0	1.2	1	3.5	ICx	[33, 47, 65, 66]
I9. CO₂ Emissions	km	27	0	15	2	0.9	DCv	[33]

Table 3. Coefficients and parameters of each sub-indicator

I_x	Sub-Indicator	Unit	X_{max}	X_{min}	C	K	P	shape	References
I₃	Access to Emergency Services	min.	20	4	9.2	0.8	3.4	(DS)	[50, 58, 67]
I₇	Density	pers./Ha	349	9	360	0.05	2.5	(DCx)	[33, 48, 49]
	Hospital	pop./N Hosp.	180,000	50,000	220,000	0.5	4	(DCx)	[33, 48, 49]
	School	pop./N Sch.	2,100	200	2,150	0.05	3	(DCx)	[33, 48, 49]
	Green Area	m ² /pop	20	2	13	0.15	6	(ICx)	[33, 47-49]
	Police	pop./N P.S.	14,000	1,300	15,000	1	3	(DCx)	[33, 48, 49]
	Fire Station	pop./ N F.S.	300,000	10,000	400,000	1	3	(DCx)	[48, 50, 58, 68]

Table 4. Weights assigned to indexes based on expert assessments

Requirement	Criterion	Indicator
R ₁ . Economic (45%)	C ₁ . Investment (100%)	I ₁ . Land Price (75%)
		I ₂ . Cost of site preparation (25%)
R ₂ . Social (25%)	C ₂ . User Safety (60%)	I ₃ . Access (30%)
		I ₄ . Population Coverage (20%)
		I ₅ . Distance from Source of Danger (50%)
	C ₃ . Flexibility (40%)	I ₆ . Property and Land Use Zoning (60%)
		I ₇ . Neighbourhood Acceptability (40%)
R ₃ . Environmental (30%)	C ₄ . Land Use (25%)	I ₈ . Respect for the Environment (100%)
	C ₅ . Emissions (75%)	I ₉ . CO ₂ Emissions (100%)

Table 5. Sustainable subsets obtained by the algorithm based on different weight assignments

Subset	Method	SI	Assigned Weights			Selected Sites	Total Area (ha)
			Ec.	Sc.	En.		
A	AHP	0.52	45%	25%	30%	S ₂ , S ₄ , S ₅ , S ₆ , S ₁₇ , S ₁₈ , S ₁₉	50.5
B	SE/AHP	0.60	45%	25%	30%	S ₃ , S ₄	53.0
C	SE/NW	0.69	-	-	-	S ₂ , S ₃	50.0

Table 6. Consideration of the subsets obtained by other methods

Subset	A	B	C	A	B	C	A	B	C
Weighting	AHP	AHP	AHP	SE/AHP	SE/AHP	SE/AHP	SE/NW	SE/NW	SE/NW
SI	0.52	0.41	0.37	0.56	0.60	0.55	0.49	0.66	0.69

Table A.1. Ranked Sets, including sites, SIs, and satisfaction values of indexes, based on sustainability index by MIVES+Knapsack with considering AHP weights

Alternative	Sites of Selected Set	SI	Total Area	Indicators and Sub-indicators Satisfaction Values													
				I ₁	I ₂	I ₃	I ₄	I ₅	I ₆	SI ₂	SI ₃	SI ₄	SI ₅	SI ₆	SI ₇	I ₁₃	I ₁₄
A ₁ (A)*	S ₂ , S ₄ , S ₅ , S ₆ , S ₁₇ , S ₁₈ , S ₁₉	0.5247	50.5	0.2216	0.3843	0.9784	0.9422	0.9520	1.00	0.0117	0.3762	0.2316	0.1896	0.1463	0.3591	0.5276	0.6913
A ₂	S ₂ , S ₄ , S ₅ , S ₁₂ , S ₁₃ , S ₁₇ , S ₁₈ , S ₁₉	0.5217	50.9	0.2492	0.3200	0.9826	0.9486	0.8723	1.00	0.0095	0.3711	0.2346	0.3533	0.2586	0.3988	0.5268	0.6839
A ₃	S ₂ , S ₄ , S ₅ , S ₁₄ , S ₁₇ , S ₁₈ , S ₁₉	0.5214	50	0.2514	0.3810	0.9720	0.9488	0.8624	1.00	0.0091	0.3697	0.2332	0.3351	0.2523	0.3923	0.5287	0.6544
A ₄	S ₂ , S ₄ , S ₅ , S ₆ , S ₁₂ , S ₁₇ , S ₁₉	0.5209	52.6	0.2070	0.3937	0.9837	0.9453	0.9175	1.00	0.0177	0.3972	0.2425	0.2374	0.1710	0.3910	0.5234	0.6989
A ₅	S ₂ , S ₄ , S ₅ , S ₆ , S ₁₃ , S ₁₇ , S ₁₉	0.5193	50.3	0.2103	0.3814	0.9824	0.9440	0.9318	1.00	0.0166	0.3949	0.2392	0.2001	0.1552	0.3744	0.5281	0.6891

*Alternative A₁ is the set A, which has been chosen by the AHP technique. The alternatives have been selected and ranked from one to five based on the sustainability indexes.

Table A.2. Percent change in indicators' weights and sensitivity coefficients

Pair of alternatives	Indicators' and Sub-indicators' Satisfaction Values													
	I ₁	I ₂	I ₃	I ₄	I ₅	I ₆	SI ₂	SI ₃	SI ₄	SI ₅	SI ₆	SI ₇	I ₁₃	I ₁₄
A ₁ -A ₂	-32.29	41.59	-1603.18	-1566.88	51.20	N/F	N/F	N/F	-14601.04	-267.50	-389.82	-1102.98	N/F	N/F
A ₁ -A ₃	-32.89	N/F	N/F	-1669.69	50.15	N/F	N/F	N/F	-29957.32	-331.16	-454.82	-1453.81	-4178.18	39.92
A ₁ -A ₄	75.62	-355.04	-1579.23	-4024.14	N/F	N/F	-9016.29	-2586.93	-5017.33	-1135.28	-2200.09	-1700.91	N/F	-218.54
A ₁ -A ₅	N/F	N/F	-3015.77	-10155.95	N/F	N/F	-16037.54	-4217.84	-10364.06	-7421.90	-8844.46	-5142.33	-17144.77	N/F
A ₂ -A ₃	-40.35	-4.41	63.33	-4800.69	41.67	N/F	N/F	N/F	N/F	N/F	N/F	N/F	-213.96	4.57
A ₂ -A ₄	5.06	-8.71	-1486.61	N/F	-21.65	N/F	-1278.22	-401.61	-1342.35	90.60	N/F	N/F	N/F	-21.33
A ₂ -A ₅	18.21	-34.66	N/F	N/F	-54.50	N/F	-4908.40	-1463.45	-7593.05	N/F	N/F	N/F	-2552.52	-201.02
A ₃ -A ₄	2.79	-29.37	-79.52	N/F	-10.32	N/F	-709.29	-221.64	-661.45	62.35	74.95	N/F	N/F	-4.19
A ₃ -A ₅	15.05	-4685.65	-445.20	N/F	-40.84	N/F	-4071.19	-1209.68	-5089.33	N/F	N/F	N/F	N/F	-26.76
A ₄ -A ₅	-149.77	N/F	N/F	N/F	-157.88	N/F	N/F	N/F	N/F	N/F	N/F	N/F	-481.46	76.27
Sensitivity Coefficient	0.3583	0.2266	0.0158	0.0006	0.0969	N/F	0.0014	0.0045	0.0015	0.0160	0.0133	0.0009	0.0047	0.2389

N/F = no feasible