DOI 10.51558/2303-5161.2023.11.11.1 Scientific Paper

LOCALLY CHARACTERISED REPETITIVE ILLEGAL LANDFILLS CLASSIFICATION

Tihomir Knežiček[1], Dean Osmanović[2], Sabina Sinanović Ćatibušić[3]

SUMMARY

Illegal dumping of waste material is present in almost all local communities in Bosnia and Herzegovina, including in the areas of urban and rural local communities of the City of Tuzla. Uncontrolled waste dumping at the landfields, as the illegal dumping, are created by dumping different types of waste material in areas that are not intended for waste material disposal. These are areas that are usually next to roads with less traffic, or in the immediate vicinity of roads where access is possible for motor vehicles with a lower load capacity. Illegal landfills have a direct negative impact on the living environment from several aspects. Primarily, watercourses and soil are polluted, the ambient space is disturbed, and by attracting animals, there is the possibility of infections that are dangerous for the population. Waste materials in illegal landfills are often deliberately set on fire, which causes additional problems of air pollution with smoke and gases resulting from combustion, as well as the possibility of fire outbreaks, especially in forest areas. In the current practice, illegal waste landfills did not have scientific and professional interest because they are often of a temporary nature and were not considered interesting from the aspect of the scientific approach to defining landfills by different classifications. This paper defines the classification of illegal landfills in the spheres of data processing possibilities of interest for the treatment of illegal waste landfills, and the experimental definition of the classification was confirmed on the example of the recording and analysis of illegal waste landfills in the local community of Kiseljak, City of Tuzla in the phase of implementing the project „Inclusive development of Kiseljak community for improvement of social and economic aspect of citizens, emphasizing Roma population“, finance by Foundation of Tuzla community, Tuzla. The basis of the classification is made up of repetitive local waste landfills, while permanent regional waste landfills are not the subject of research and classification since there are already known classifications for permanent waste material landfills.

Consent for the publication of the paper was given by the Tuzla Community Foundation, which financed the referral research within the project "Inclusive development of the Kiseljak community, for the improvement of the social and economic aspects of the citizens' life, especially the Roma", implemented by the Tuzla Community Foundation in partnership and financial support of the Freudenberg Foundation and the German Federal Ministry for External Development (BMZ).

1. INTRODUCTION

The analysis of the ambient and the conditions for the generation of illegal dumping of waste material landfields in the Kiseljak community resulted, on scientific grounds, in the classification of illegal landfills according to several criteria. In the earlier practices of the illegal landfills analyses, the scientific and professional aspects of illegal landfills are not adequately defined, so the research and analysis are of particular importance not only for a practical systemic solution to the reduction or removal of illegal

[1] PdD, University of Tuzla, Faculty of mining, geology and civil eng., Univerzitetska 2, Tuzla, Bosnia and Herzegovina, knezicek@bih.net.ba
[2] PhD student, Salonit Anhovo d.d., Anhovo 1, Deskle, Slovenia, dean.osmanovic@gmail.com
[3] BA, The Tuzla Community Foundation, Pozorišna 13, Tuzla, Bosnia and Herzegovina, sabina@fondacijatz.org

landfills, but also for contributing to the scientific overview of the problems related to locally generated illegal landfills. Categorization facilitates the monitoring of the creation, development and removal of illegal landfills using landfill databases and GIS. The composition of locally generated landfills of waste material are mainly based on:

• unsorted household waste (mixed organic and inorganic waste, solid waste),
• construction waste and car tires (building material, glass, car tires),
• biological waste (plant remains, branches, animal remains) and
• waste material remains after recycling selection (material of useless disassembled devices, machines and vehicles and separating material that has no market value).

With regard to the various aspects of the generation and development of illegal or legal landfills at the local (community) level, i.e. the disposal of different types of materials, and the already established methodology and categorization of waste material, the classification does not include the following types of landfills and types of waste material:

• regional or local communal / sanitary landfills;
• industrial waste landfills (sludge, lubricants, slag or tailings landfills, waste generated by production processes);
• hazardous waste landfills (medical, slaughterhouse, pesticides, oils, lubricants);
• landfills containing liquid waste (water and additives in technological processes, chemical reagents, detergents).
It is expected that local illegal landfills do not contain industrial, hazardous waste and waste in a liquid state, and even if it is present, its localization is an isolated case and there is no systemic negative impact on the environment.

2. GROUPING ILLEGAL LANDFILLS

Illegal landfills of municipal waste, household waste and other types of locally generated waste are divided into permanent regional landfills and repetitive local landfills based on their origin and volume.

i. Permanent regional landfills

Permanent regional landfills are used for unselected depositing of all types of waste, including potentially dangerous materials for the environment.

They are divided into flat terrain landfills (depositing waste at the level of material dumping) and slope landfills (dumping material below the ground level i.e. down the slopes, mostly near roads).

Slope landfills generated down the slopes where at the bottom are waterflows or watersheds are a direct source of water and soil pollution. They are characterized by large volumes of waste material (regularly shaped with the volume of more than 100 m^3 of waste material), with a significant impact on waterflows and soil, and with a significant presence of animal species that are potential carriers of diseases (birds, rodents, dogs, foxes, wild pigs and others animals that look for food and find it in illegal landfills). Their elimination requires significant financial sources for the removal and transportation of waste material to another location that must be a legal/sanitary waste dump. The possibility of regenerating permanent regional landfills is great, and to eliminate the process of generating illegal landfills, it is necessary to either apply restrictive measures that would affect the reduction of the amount of waste material in illegal landfills, or provide containers in which waste material that would otherwise be dumped on illegal landfill locality.

Permanent regional landfills are not the subject of locally characterised illegal landfills classification.

ii. Repetitive local illegal landfills

Repetitive local landfills are temporary landfills. These are landfills that are generated at one time, and after a certain time, the landfills are removed by the competent municipal services or citizens through

environmental cleaning actions. In a large number of cases, in the same localities, illegal landfills are repeatedly generated and the cycle repeats itself. The possibility of regenerating illegal landfills tends to decrease with the achievement of the prerequisites for systematic waste management.

They are characterized by medium volumes of waste material (10 m^3 to 100 m^3) or small volumes of waste material (0.5 m^3 to 10 m^3), without significant impact on waterflows and soil, unless the landfills are in the immediate vicinity of the water source. Repetitive local landfills do not have a significant presence of animal species that are potential carriers of diseases, which are mainly dogs and rodents. Their disposal does not require significant financial resources for the removal and transportation of waste material to another location, that must be a legal waste dump.

An important characteristic of repetitive local landfills is the negative impact on the visual environment within the local community, especially if the local community bases its strategies on the tourist potentials or recreational facilities and infrastructure, such as the example of the suburban local community of Kiseljak, Tuzla, which has quality prerequisites for community development by offering tourist and recreational facilities.

3. LOCALLY CHARACTERISED REPETITIVE ILLEGAL LANDFILLS CLASSIFICATION

i. Compact illegal landfills occupy one compact area with clearly defined spatial boundaries, in which there is only one landfill with dimensions up to 50 X 50 m. The space of the landfill is of regular or irregular shape. The height of the deposited waste material is in the range of 0.5 m to 1 m, formed in shallow piles. The composition of waste material is extremely diverse and unselected. Waste material is dumped by trucks, tractor's trailers, motor cultivator's trailers or vans. Landfills has adequate access from official roads (paved or unpaved), at least 2 km away from the human settlements.

Figure 1. An example of a compact illegal landfill in Kiseljak community, Tuzla

ii. Linear scattered illegal landfills occupy area mainly along the length of the line, with possible smaller gaps between the dumped waste material, length 2 m to 50 m, depth of dumping usually up to 2 m, contains different waste material, mainly household or construction waste (tiles, bricks, mortar, glass). The height of the dumped material is up to 0.5 m. The material is dumped from cars, tractor trailers or vans. They are located right next to the official road (paved or unpaved), at least 100 m away from the human settlement, although there are cases where it is located in the settlement itself.

Figure 2. An example of a linear illegal landfill in Kiseljak community, Tuzla

iii. Lenticular illegal landfills occupy an irregular formation, often in the shape of lenses, characterized by individual shallow piles of waste material. The height of the deposited material is up to 0.5 m, the volume is up to 0.5 m^3, and they are 5 to 10 m apart from each other, making usually one spatially dispersed landfill. The composition of the waste material is different and partly selective, and it consists household waste, construction waste material or other types of waste. They are mostly located in the forest area, and the material is brought in by handcarts or cars if there is a possibility for cars to approach.

Figure 3. An example of a lenticular illegal landfill in Kiseljak community, Tuzla

iv. Infrastructural illegal landfills take a mostly regular shape that closely matches the dimensions of the infrastructural object that has been demolished, devastated and is not in use. The composition of the waste material is in the category of construction waste (mainly concrete elements, siporex solid blocks, bricks, tiles, salonit panels). The landfill is not generated because it represents the rest of the former infrastructure facility. They are located outside urban areas or near urban areas, often in the settlement itself or in the immediate vicinity.

Figure 4. An example of an infrastructural illegal landfill in Kiseljak community, Tuzla

Often, in addition to the infrastructural landfill, lenticular landfills located next to the demolished building or in the building itself are also generated, and the composition of the waste material is different and partly selective, consisting of household waste, construction material waste, solid plastics, textiles, dead animals or other types of waste. The material is brought in by handcart.

Figure 5. An example of a hillside illegal landfill in Kiseljak community, Tuzla

v. Hillside illegal landfills, occupy a fairly regular shape that is formed by the generation process of the landfill. The shape is a trapezoid where the width of the landfill is greater in the upper part (up to 15 m), the landfill stretches down the slope towards the valley and ends with a width of up to 3 m. The length of the slope is variable and ranges from 3 m to 20 m, and the height of the dumped material is up to 1 m, including bulky waste. It contains various waste materials, mainly bulky waste (solid plastics, household appliances, furniture parts) and construction material waste, very rarely household waste. The material is dumped from a van, from a tractor trailer, a motor cultivator trailer or from a handcart. They are located next to official road communications (paved or unpaved), at least 100 m away from the human settlement. They represent the most- risky type of landfill, given that it is generated in hillside parts that make up watersheds or waterflows, and which are difficult to remove due to the hillside characteristics of the landscape.

vi. Covered illegal landfills are landfills that have been generated, not removed, and covered with soil or other material for the purpose of remediation, or they were created by backfilling, i.e. by covering with soil, sand or gravel that has no use value. They contain mainly unsorted household waste from the household, biological waste or other types of non-bulky waste material.

Figure 6. An example of a cover illegal landfill in Kiseljak community, Tuzla

vii. Private illegal landfills are landfills that are generated and located on the private properties of local residents. Private landfills contain construction waste or waste from the processing of selecting secondary raw materials. Landfills are created by depositing construction material waste as a result of demolition or remodelling private infrastructure, located on private property. Often, after a certain time, the deposited material is removed by the owner of the property. Another type of private illegal landfills is created as a result of the collecting secondary raw materials, so that families engaged in collecting and selling secondary raw materials in their own yard generate small heaps landfills of material that has no use value. The treatment of these landfills depends solely on the owner of the property, and the waste material mainly consists of solid plastic, electronic or construction waste. Private landfills have a negative impact

on the visual environment in the community, since they are often located in urban areas of the local community.

Figure 7. An example of a private illegal landfill in Kiseljak community, Tuzla

4. CONCLUSIONS

In the context of the need to preserve the environment, it is necessary to establish the treatment of Illegal landfields that are created by depositing waste material, of different composition, in the wider area of local communities. From a scientific and professional point of view, illegal landfields of a regional character are analysed, which generally contain more than 100 m^3 of different mixed waste material. The need for analyses is based on the significant negative impact on the environment - on soil, water and air, as well as the consequences arising from the impact of illegal waste deposing at landfields. On the other hand, locally formed illegal landfields are not the subject of scientific and professional research, since they are repetitive in nature, they are not considered as threats for the environment and can be removed in a short period of time and without large costs for removing the deposited waste material. Local landfields and waste material content are categorized into seven occurrence groups: compact landfields, linearly scattered landfields, lenticular landfields, infrastructural landfields, hillside landfields, covered landfields, and private landfields. The classification of repetitive illegal waste landfields locally characterised was researched and confirmed on the example of illegal landfields in the area of the local community Kiseljak, Tuzla. The classification of local waste landfields enables systematic monitoring of the generating, development and removal of illegal landfields using information technologies and Internet tools.

Annex 1. The example of database for repetitive illegal landfills in Kiseljak community.

ID	NAZIV	ISTOCNO	SJEVERNO	NADMORSKA_VISINA	IME_VEZA	DATUM	OPIS	OBLIK	površina, m^2	zapremina, m3 (veličina simbola)	sastav deponije	stepen prioriteta	kategorija
1	A_ASFALT1	6543824	4927695	220	44	24.4.2022	Uvučena pored asfalta put vikendice, nedavno očišćena, bivša (po	više gomila	2 X 2 X 0,3	1,2	čvrsta plastika, suva trava, građevinski	Treći, Na općini Lukavac	kompaktna
1	A_ASFALT2	6543865	4927769	227	45	24.4.2022	Pored puta za vikendice 1	trapez padina	15 X 3 padina 8 (72), visina 0,4	28,8	kućni otpad, plastika,boce, čvrsta plastika, gume, deke,	Prvi	padinska
1	A_ASFALT3	6543864	4927752	225	46	24.4.2022	Pored puta za vikendice 2	kvadar dugački	3 X 1 X 0,5	1,5	plastika, građevinski, kućni otpad	Prvi	linijski razuđena
1	A_ASFALT4	6543879	4927840	232	47	24.4.2022	Pored puta za vikendice 3	kvadar	2 X 1 X 0,5	1	plastika, građevinski, kućni otpad	Prvi	linijski razuđena
1	A_ASFALT5	6543891	4927857	234	48	24.4.2022	Pored puta za vikendice 4	okrugla gomila	1 X 1 X 0,2	0,2	smotani kablovi	Prvi	linijski razuđena
1	A_ASFALT6	6543907	4927944	244	49	24.4.2022	Pored puta za vikendice 5	trapez padina	5 X 3 padina 4 (16), visina 0,4	6,4	čvrsta plastika, deke, građevinski	Prvi	padinska
1	A_ASFALT7	6543927	4928001	251	50	24.4.2022	Pored puta za vikendice 6	kvadar dugački	3 X 1 X 0,5	1,5	plastika, građevinski, kućni otpad	Prvi	linijski razuđena
2	B_PARKING1	6544587	4927890	279	51	24.4.2022	Asfalt prema parkingu 1	kvadar dugački	5 X 1 X 0,3	1,5	plastika, građevinski, kućni otpad	Drugi	linijski razuđena
2	B_PARKING2	6544604	4927523	249	52	24.4.2022	Asfalt prema parkingu 2	kvadar dugački	5 X 1 X 0,3	1,5	plastika, građevinski, kućni otpad	Drugi	linijski razuđena
2	B_PARKING3	6544640	4927521	249	53	24.4.2022	Asfalt prema parkingu 3	kvadar dugački	5 X 1 X 0,3	1,5	plastika, građevinski, kućni otpad, drvo	Drugi	linijski razuđena
2	B_PARKING4	6544685	4927588	257	54	24.4.2022	Asfalt prema parkingu 4	kvadar dugački	5 X 1 X 0,3	1,5	plastika, građevinski, kućni otpad, gume	Drugi	linijski razuđena
2	B_PARKING5	6544682	4927650	263	55	24.4.2022	Asfalt prema parkingu 5	kvadar dugački	6 X 1 X 0,5	3	plastika, kućni otpad	Drugi	linijski razuđena
2	B_PARKING6	6544683	4927736	269	56	24.4.2022	Asfalt prema parkingu 6	kvadar dugački	1 X 1 X 0,3	0,3	plastika, građevinski, kućni otpad	Drugi	linijski razuđena
2	B_PARKING7	6544673	4927772	273	57	24.4.2022	Asfalt prema parkingu 7	kvadar dugački	5 X 1 X 0,3	1,5	plastika, kućni otpad	Drugi	linijski razuđena
2	B_PARKING8	6544618	4927857	277	58	24.4.2022	Asfalt prema parkingu 8	kvadar dugački	5 X 4 X 0,3	6	plastika, kućni otpad	Drugi	linijski razuđena
2	B_PARKING9	6544645	4927546	245	NA	24.4.2022	Parking gornji	kvadrat	20X10X0,3	60	goretina, kruti otpad, odjeća, obuća,	Prvi	kompaktna
2	B_PARKING10	6544655	4927522	244	NA	24.4.2022	Parking donji	kvadrat	20X12X0,3	40	kruti otpad,	Prvi	kompaktna
2	B_PARKING11	6544623	4927521	244	NA	24.4.2022	Pojas uz donji parking	kvadar	35X1,5X0,5	46,6	kruta plastika, granje, građevinski	Prvi	infrastrukturna
3	C_KISELJAK1	6545421	4927571	221	38	24.4.2022	Stari TTU hotel ruševina	kvadar	25 X 15 X 1,5	562,5	betonski elementi	Treći	kompaktna
3	C_KISELJAK2	6545425	4927574	221	NA	24.4.2022	Uz stari TTU hotel 1	nepravilan	3 X 1,5 X 0,5	2,25	gnojivo, plastika, deke, kućni otpad, čvrsta plastika	Prvi	sočasta
3	C_KISELJAK3	6545425	4927571	221	NA	24.4.2022	Uz stari TTU hotel šuma 2	kvadar dugački	7 X 1 X 0,2	1,4	kućni otpad, plastika	Drugi	sočasta
3	C_KISELJAK4	6545420	4927568	221	NA	24.4.2022	Uz stari TTU hotel šuma 3	5 malih gomila	5 X 0,6 X 0,6 X 0,2	0,36	kućni otpad, plastika	Drugi	sočasta
3	C_KISELJAK5	6545350	4927571	235	39	24.4.2022	Put od starog TTU hotela u blizini privatne kuce u sumi	6 gomila	13 X 1 X 0,2	2,6	kućni otpad, plastika, pljevina, boce, čvrsta plastika	Drugi	linijski razuđena
3	C_KISELJAK6	6545360	4927568	233	NA	24.4.2022	Put od starog TTU hotela u šumi	5 gomila malih	5 X 0,5 X 0,5 X 0,2	0,25	kućni otpad, plastika	Drugi	sočasta
3	C_KISELJAK7	6545446	4927498	220	40	24.4.2022	Merhamet do hatema	mrtva / vrlo mala go	0,4 X 0,4 X 0,2	0,03	kućni otpad	Drugi	kompaktna
3	C_KISELJAK8	6545166	4927384	214	41	24.4.2022	Uz devastirani privatni hotela (pored puta) Jezero	kvadar dugački	30 X 2 X 2	120	kućni otpad, plastika,boce, čvrsta plastika, gume, deke,	Prvi,Na općini Živinice	kompaktna
3	C_KISELJAK9	6545117	4927387	212	42	24.4.2022	U nastavku devastiranog privatnog hotela pored puta	kvadar dugački	35 X 2 X 0,5	17,5	kućni otpad, plastika,boce, čvrsta plastika, gume, deke,	Prvi,Na općini Živinice	kompaktna
3	C_KISELJAK10	6545105	4927419	218	43	24.4.2022	Preko puta devastirani ugostiteljski objekt, u šumi	nepravilan	3 X 2 X 0,2	1,2	kese, pljevina, plastika	Treći	sočasta
3	C_KISELJAK11	6545538	4927598	211	23	24.4.2022	Kod betonske kanalice sa vodom kod izvora Kiseljak	kvadar dugački	9 X 1 X 0,2	1,8	kućni otpad, plastika, kese, boce	Prvi	sočasta
3	C_KISELJAK12	6545546	4927578	230	NA	24.4.2022	U sklopu kod izvora Kiseljak	kvadar	1,5 X 1 X 0,2	0,3	kućni otpad, deke, guma, salonit ploče	Prvi	kompaktna
4	D_NETEKE1	6547303	4926695	208	wpt4	24.4.2022	Neteke kompleks deponija - velika pored pruge	nepravilan	12 X 7 X 0,3	25,2	gume, građevinski, čvrsta plastika, granje	Treći	kompaktna, prekrivena
4	D_NETEKE2	6547296	4926664	207	NA	24.4.2022	Neteke kompleks deponija - šumski put 1	kvadar	8 X 2 X 0,5	8	građevinski, drvo, rastinje, boce, plastika, kućni	Treći	linijski razuđena
4	D_NETEKE3	6547295	4926645	207	NA	24.4.2022	Neteke kompleks deponija - šumski put 2	kvadar	3 X 1 X 0,5	1,5	građevinski	Treći	infrastrukturna
4	D_NETEKE4	6547294	4926631	207	wpt1	24.4.2022	Neteke kompleks deponija - šumski put 3	kvadar	5 X 3 X 0,2	3	plastika, boce	Treći	sočasta
4	D_NETEKE5	6547287	4926602	207	wpt2	24.4.2022	Neteke kompleks deponija - šumski put 4	3 gomile	3 X 2 X 2 X 0,3	3,6	kruta plastika, granje, građevinski	Treći	sočasta
4	D_NETEKE6	6547316	4926676	208	NA	24.4.2022	Neteke kompleks deponija - put za pragu 1	2 gomile	2 X 1,5 X 1,5 X 0,3	1,35	građevinski	Treći	infrastrukturna
4	D_NETEKE7	6547317	4926690	208	wpt6	24.4.2022	Neteke kompleks deponija - put za pragu 2	kvadar	3 X 1 X 0,5	1,5	građevinski	Treći	infrastrukturna
4	D_NETEKE9	6547287	4926688	208	NA	24.4.2022	Neteke kompleks deponija - šuma uz veliku deponiju i potok	gomila	3 X 2 X 0,3	2	gume (uračunata zapremina u Neteke	Prvi	kompaktna
5	F_USKA PRUGA1	6548010	4927792	240	wpt6	24.4.2022	Uskotračna pruga - crijep 1	kvadar	4 X 1 X 0,3	1,2	crijep	Treći	infrastrukturna
5	F_USKA PRUGA2	6548012	4927806	240	NA	24.4.2022	Uskotračna pruga - crijep 2	kvadar	6 X 1,5 X 1	9	crijep	Treći	infrastrukturna
5	F_USKA PRUGA3	6548013	4927823	240	wpt7	24.4.2022	Uskotračna pruga - šumski put 1	nepravilna	2 X 1 X 0,3	0,6	čvrsta plastika, kućanski aparati, granje	Drugi	sočasta
5	F_USKA PRUGA4	6548021	4927850	240	wpt8	24.4.2022	Uskotračna pruga - šumski put 2 vododjelnica	nepravilna	10 X 8 X 0,3	24	gnojivo, granje, boce, plastika, građevinski	Prvi	sočasta
5	F_USKA PRUGA5	6548043	4927879	241	wpt9	24.4.2022	Uskotračna pruga - šumski put 3	kvadar	3 X 1 X 0,5	1,5	crijep	Treći	infrastrukturna
5	F_USKA PRUGA6	6548070	4927899	242	wpt10	24.4.2022	Uskotračna pruga - šumski put 4 potok	kvadar	4 X 3 X 0,5	6	crijep, građevinski, čvrsta plastika	Treći	infrastrukturna
5	F_USKA PRUGA7	6548036	4927866	241	NA	24.4.2022	Uskotračna pruga - crijep 7	kvadar	3 X 1,5 X 0,2	0,9	šibje	Treći	kompaktna
6	H_KLIUŠA1	6545727	4928780	214	wpt15	24.4.2022	Poljana pruga Šatbci	nepravilan, više gom	5 X 3 X 0,3	4,5	građevinski, gajbe, plastika, čvrsta plastika, klasure	Treći	kompaktna
6	H_KLIUŠA2	6545708	4928862	208	wpt16	24.4.2022	Klisla - put za pčelinjak 1	1 gomila	2,8 X 1 X 0,6	1,7	crijep	Treći	infrastrukturna
6	H_KLIUŠA3	6545693	4928888	207	wpt17	24.4.2022	Klisla - put za pčelinjak 2	1 gomila	2,8 X 1 X 0,6	1,7	crijep	Treći	infrastrukturna
6	H_KLIUŠA4	6545685	4928916	206	wpt18	24.4.2022	Klisla - put za pčelinjak 3	1 gomila	2,8 X 1 X 0,6	1,7	crijep	Treći	infrastrukturna
7	I_RAKOVAC	6544968	4928894	198	35	24.4.2022	Deponija na potoku Rakovac	trapez	24 X 20 X 1,5	720	građevinski otpad, gume	Prvi	linijski razuđena
8	J_ZASJEKE1	6544181	4928649	208	wpt19	24.4.2022	Put Poljana - Bokavići Zasjeke 1	nepravilna	6 X 1 X 0,2	1,2	drvo, vuna, keramika	Prvi, Na općini Lukavac	linijski razuđena
8	J_ZASJEKE2	6544212	4928659	207	wpt20	24.4.2022	Put Poljana - Bokavići Zasjeke 2 put šuma	kvadar, više gomila	3 X 1 X 0,3	0,9	keramika, građevinski, staklo	Prvi, Na općini Lukavac	linijski razuđena
8	J_ZASJEKE3	6544213	4928672	206	wpt21	24.4.2022	Put Poljana - Bokavići Zasjeke 3 put šuma	kvadar	15 X 1 X 0,3	4,5	građevinski, gume, drvo, staklo	Prvi, Na općini Lukavac	linijski razuđena
9	K_OSTALE1	6546002	4928056	252	wpt23	24.4.2022	Izlaz iz MZ pored puta i pruge	kvadar	7 X 3 X 1	21	građevinski	Treći	infrastrukturna
9	K_OSTALE2	6545666	4927321	227	22	24.4.2022	Porušena građevina hotel - od poste jugoistocno 100 m	kvadar (50% prosto	30 X 30 X 0,5 (50%) = 450 m2	225	betonski elementi	Treći	infrastrukturna
9	K_OSTALE3	6546241	4927484	219	24	24.4.2022	propust kanala (otvorena kanalizacija sa smećem)	linijski	7 X 0,2 X 0,1	0,14	fekalije i kućni otpad na obali potoka	Prvi	kompaktna
10	L_PRIVATNE1	6545751	4927637	218	wpt22	24.4.2022	U dvorištu srušena kuća - nasipanje parcele	gomila	2 X 2 X1	4	građevinski - možda služi kao nasipni materijal za objekat	Treći	privatna
10	L_PRIVATNE2	6545697	4927758	222	37	24.4.2022	Privatna parcela (deponovano smeće - sakupljač sekundarnih siro	dvorište	neodređeno	1,5	čvrsta plastika, najlon	Prvi	privatna
11	M_VRUCAK1	6547330	4927649	242	wpt11	24.4.2022	Vrućak - šuma 1	kvadar	6 X 4 X 0,2	4,8	kućni otpad, kese	Treći	sočasta
11	M_VRUCAK2	6547309	4927567	246	wpt12	24.4.2022	Vrućak - šuma 2	gomila	3 X 1 X 0,2	1,8	kućni otpad, kese, kruti otpad	Treći	sočasta
11	M_VRUCAK3	6547321	4927655	244	NA	24.4.2022	Vrućak - šuma 3	mala gomila	1 X 1 X 0,2	0,2	kućni otpad, kese	Treći	sočasta
12	N_BREZE1	6546593	4927000	211	25	24.4.2022	Breze stara deponija, očišćeno, opet nastaje deponija	gomila	1,5 X 1 X 0,2	0,3	goretina, kućni otpad	Treći	kompaktna
12	N_BREZE2	6546618	4926975	211	NA	24.4.2022	Breze šuma pored puta, očišćena, ponovo nastaje	kvadar	5 X 2 X 0,2	2	kućni otpad	Treći	kompaktna
									ukupno zapremina	1998,48			

REFERENCE

1. Analiza sektora upravljanja čvrstim komunalnim otpadom - Strateški pravci i planiranje investicija do 2025.g. Tehnička pomoć za izgradnju dugoročne održivosti integriranog upravljanja čvrstim otpadom u Bosni i Hercegovini, WB, SIDA, 2018.
2. Centri civilnih inicijativa, Mapiranje divljih deponija, projekat, Tuzla, 2019. http://www.cci.ba/focus/1/41/65.html.
3. Centar za ekologiju i energiju, Redovan odvoz otpada u slivu akumulacije Modrac, Tuzla, 2014.
4. EPA, Report illegal waste disposal, Reviewed 24 February 2023.
5. EPA, Illegal Dumping Prevention Guidebook, EPA 905-B-97-001, March 1998.
6. Internet izvor https://www.conserve-energy-future.com/causes-effects-solutions-illegal-dumping.php
7. Knežiček T., Tretman neformalnog sakupljanja sekundarnih sirovina i mjere za unapređenje turističkih potencijala u MZ Kiseljak, istraživanje za FTZ, Tuzla 2018.
8. Knežiček T., Analize stanja ilegalnih deponija u MZ Kiseljak, istraživanje za FTZ, Fondacija tuzlanske zajednice ISBN 978-9958-1930-3-3, Tuzla 2022.
9. Ministarstvo prostornog uređenja i okoliša, Zbornik radova, Održivi razvoj i upravljanje otpadom, Sarajevo, 1996.
10. Novaković V. i drugi, Zagađenje i zaštita zemljišta i podzemnih voda, Novi Sad, 2018.
11. Utjecaj komunalnog otpada na okoliš na području Zeničko-dobojskog kantona, Srednjobosanskog kantona/Kantona Središnja Bosna i Sarajevskog kantona, REZ - Regionalna razvojna agencija za regiju Centralna BiH d.o.o, Zenica, 2017.
12. Vodič kroz ilegalne deponije: Ilegalne deponije na području Tuzlanskog kantona i FBiH, Revolt i drugi, Tuzla, 2022.