Rehabilitation of the Hiriya Landfill, Tel Aviv

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Abstract

Hiriya, a closed domestic waste landfill, is situated on the wide river plain in the southeast of Tel Aviv. The impressive landmark is part of the future Ariel Sharon Park. It is getting rehabilitated since 2004. Aim is to preserve its captivating silhouette and to develop the landscape of and around the mountain by using construction techniques that take into consideration the waste tip's instability and make use of local materials whilst incorporating the region's traditional land uses and specific climatic conditions. The artificial appearance of the landscape and its origins become a part of a positive experience of the site – a convergence of nature and culture.

Keywords

Landfill Rehabilitation, Stormwater Retention, Resilient Park Landscape, Recycling & Education, Transformation

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The *Hiriya* landfill, possibly the largest waste tip in the Near East, came to be in 1952 on the site of a Palestinian village abandoned in the Arab-Israeli War. It is situated on an agricultural plain in the southeast of Tel Aviv and is encircled by the two rivers *Ayalon* and *Shapirim* (fig. 1). The heap has the impressive dimensions of nearly 1 kilometer, in length, and 87 meters in height, and contains 16 million cubic meters of household waste. The annual river floods wash around the foot of the mesa's steep slopes, adding to the risk of the large and unstable hill's collapse. This would result in pollution of uncontainable environmental proportions. Dangerous leakages of water and gas posed a problem from the onset. The site also became a danger for aircraft flying near *Ben Gurion* Airport as it attracted thousands of sea birds. For these reasons, the *Hiriya* landfill was closed in 1999.

As is often the case, problems seldom come alone. It almost seems fateful that in Israel, of all countries, the long dry season is followed by a short period of winter rains that cause severe flooding to some areas of Tel Aviv, often for several days. During the British Mandate several hundred hectares southeast of the city had already been earmarked for flood retention and plans drawn up for a tunnel to drain rainwater into the sea. Eventually the *Ayalon* River was converted into a large open canal through the centre of the city alongside which railway tracks and the Highway 1 and Highway 20 motorways were aligned. Due to extensive soil sealing and the resultant reduction of water retention capacity within the river catchment area as well as the rapid growth of the city into the retention area, its size became insufficient and flooding became more severe. The canal cannot be enlarged, not least because of the existing transport infrastructure.

The expanding and ever-denser region of Tel Aviv crowds out many recreation spaces and increases the distance to the open landscape. This development can only be compensated through parks being large and robust enough to incorporate safely the divergent interests of recreation-seeking visitors, flood control, nature conservation, politics, science and the arts. Hiriya is only one part of the vast Ariel Sharon Park project. Transforming the waste tip is the symbolic start of constructing a much larger park landscape, which will also have to provide capacity for retaining seven million cubic metres of floodwater from the *Ayalon* River and its tributaries (fig. 2). Despite its internal differentiation, the *Hiriya* landfill appears as a monolith in the new landscape, a spectacular peak and a prominent landmark as seen across the plain (fig. 3).

The fascinating appearance of the 'mountain' brought politicians as well as artists to the scene

Fig. 1 – The Hiriya landfill, aerial view 2004 (© Beracha Foundation).

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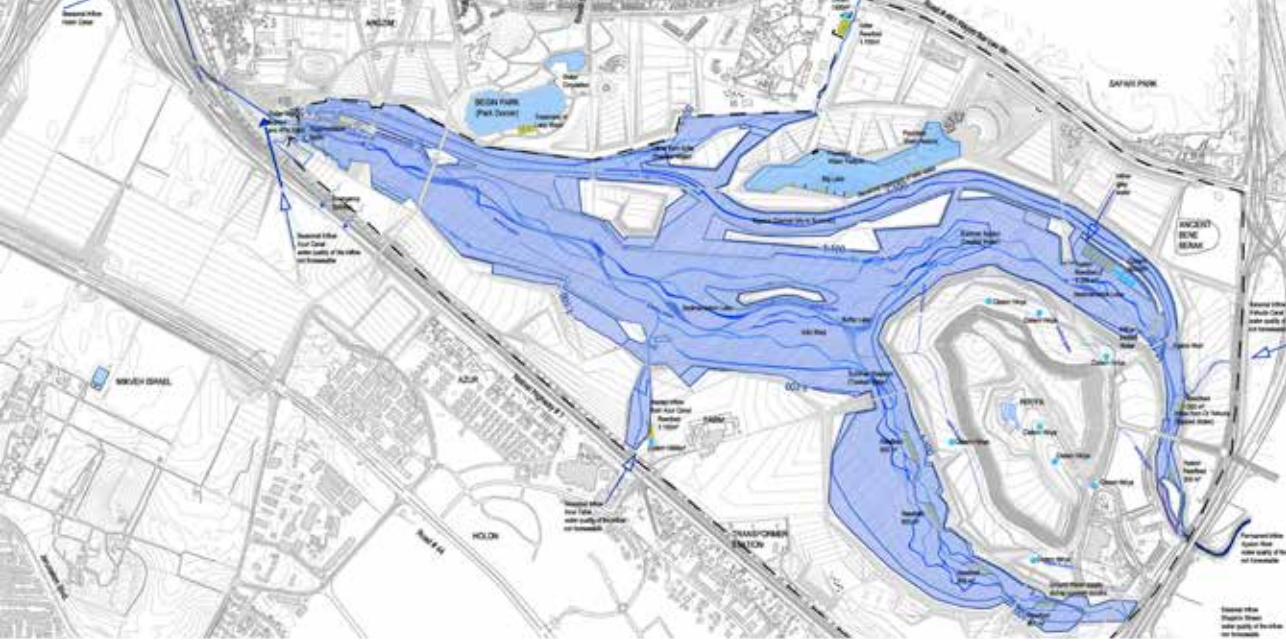
Fig. 2 –Centennial floodwater scenario in the future Ariel Sharon Park (© Latz + Partner).
Fig. 3 –Hiriya - a monolith protruding from the Ayalon plain 2004 (© Latz + Partner).
Fig. 4 –Hiriya - from the viewpoint of an artist (© Mischa Ullman).

(fig. 4). In the late 1990s, the *Beracha* Foundation under Martin Weyl worked with artists and international experts to help their search for solutions. They consulted waste disposal and hydraulic engineers, urban planners and landscape architects. In 2004, an international design competition was launched with the brief to develop ideas for rehabilitating the landfill (fig. 5). The objective was to make it a positive landmark and solve technical problems of instability, which, in addition to gas leakages, were the main factors that rendered it unusable. A competition for the 840-hectare site of what was to become *Ariel Sharon Park* followed in 2009 with the aim of turning the flood retention area into a park (fig. 6). The concepts by Latz + Partner convinced both competition juries.

Our main objective is not to hide the technical nature of structures, but to develop a new aesthetic realm of experience around them that is resilient in its cultural context. From a distance, *Hiriya* has the appearance of a 'mystical mountain' amidst the wide plain of the *Ayalon* and *Shapirim* rivers.
Our aim is to preserve its captivating silhouette. The landscape of and around the mountain gets now developed by using construction techniques that take into consideration the waste tip's instability and make use of local materials whilst incorporating the region's traditional land uses and specific climatic conditions. The artificial appearance of the landscape and its origins, not neglected, are a part of a positive experience of the site – a convergence of nature and culture (fig. 7).


BEGIN PARK
(Park Derech)
AYALON
HOLON
AZUR
ANCIENT
BONE
BANK
MIKVEH ISRAEL
TRANSFORMER
STATION

Preserving the mountain

The *Ayalon* and *Shapirim* rivers have been realigned more than one hundred meters from the mountain and meander freely through broad 'wadis'. The excavated material plus several millions cubic meters of construction demolition waste is used to build a circular landscape terrace around the foot of the slope in order to stabilize it and so retain *Hiriya's* unique landform. A new tree-covered space has been created for a variety of recreational, play and sports activities. Characteristic agricultural patterns found in the local environment, will be planted on the site, mostly in the form of olive groves and orchards. They require little water, provide shadow, are easy to maintain and perpetuate the traditional historic cultural landscape (fig. 8).

Preserving the waste

The three plateaus of the refuse heap and the oases are sealed with a combination of natural and synthetic materials, and the biogas is safely extracted and utilized. Water is still seeping from the tip and gets collected and treated in separate 'green sedimentation tanks'. A layer of gravel made of recycled construction waste, and clean soil cover the plateaus and the inner slopes of the mountain. A large amount of this material is produced in a recycling plant on the eastern mountain slope where a mas-

Fig. 6 – The Ayalon plain - becoming both a flood retention basin and a spacious park (© Latz + Partner).

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Fig. 5 – Competition plan and five landscape elements - wadi, foot terrace, steep slope, plateau and oasis (© Latz + Partner).

sive sheet pile wall secures the large levelled working platform against pressure from the mountain. The recycling plant is one of *Hiriya's* visitor attractions and is currently being extended by a large RDF waste-to-energy-plant. Coachloads of students, administration workers, politicians and the interested public from all around Israel visit the site to learn the sustainable treatment of waste and how to live with it (fig. 9).

Establishing the vegetation

On the *plateau* and the steep slopes, a drought resistant, mostly low vegetation is prevailing, as it requires little maintenance. Storm water is harvested on the *plateau* and collected in underground reservoirs during the rainy season. (Fig. 10) It is employed to irrigate densely planted areas in dry periods. Much of the vegetation along the freely meandering Ayalon and Shapirim rivers is expected to establish spontaneously.

Exploiting the topography - the oasis

A sheltered depression in the center of the mountain, once the site of a noisy and dusty waste disposal plant, has been transformed into terraced slopes and an open 'spring water landscape' for intensive use. A solid concrete platform in the center, where once large machines stood, is *Hiriya's* only

Fig. 7 – Silhouette of Hiriya with foot terrace and dislocated rivers in the wadi (© Latz + Partner).
Fig. 8 – The different landscape elements in the masterplan 2011 (© Latz + Partner).

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Fig. 9 – Waste products in the visitor center (© Latz + Partner).

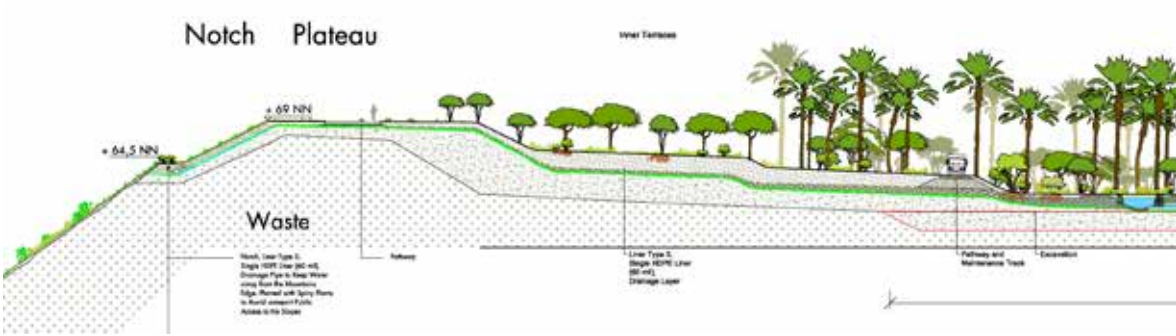

Fig. 10 – Drainage and subterranean reservoirs enable an oasis in the center (© Latz + Partner).

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Fig. 11 – Service facilities built on a concrete platform - the landfill's only stable area (© Latz + Partner).
Fig. 12 – Dry stone walls adapt to the mountain's movement (© Latz + Partner).

stable area. It accommodates central functions in the park and a café/restaurant (fig. 11). Traditional dry stone walls of recycled construction material stabilize the slopes around the valley (fig. 12). The walls are able to adapt to movement in the mountain and provide the best conditions for the type of vegetation that is characteristic of the Mediterranean and for a variety of small-scale spaces. Buried layers of gravel serve as cool storage areas for harvested rainwater that is used to top up small bodies of water throughout the year (fig. 13). The use of communal supply water to get through the dry season is to be kept to a minimum. A lush vegetation of palms and other trees, shrubs, aquatics and flowering plants has been created in the center of the park as a symbol of nature and Mediterranean culture (fig. 14).

Mise-en-scène

After arriving by car, bus or on foot (fig. 15), we first cross the Shapirim and Ayalon 'wadis' (fig.16). We cross the large terraces where, at the foot of the steep mountainside, after construction work is finished families will have picnics and people exercising will enjoy the day (fig. 17). We reach a gently sloping ramp that follows the contours of the terrain and invites us to walk up to the top of the mountain. First, we look across to the recycling plant on our left. Immediately above the working platform and secured by a sheet pile wall, a long promenade allows the recreation area to sit alongside the fascinating activities at the waste recycling plant – the origins of the park. We continue through the terraced valley on the inner mountain slopes until we reach the cool and refreshing oasis where we pause – perhaps to have a drink and to listen to the sounds of the water (fig. 18). Finally, we continue to the *plateau* where we enjoy stunning views of Ariel Sharon Park, the sea and across the green agricultural land towards Jaffa and the dunes of Holon. However, before we get there, we pass a sheltered 'indentation' on the northwestern side of the *plateau*. We sit down under spectacular wooden structures that look like over-dimensioned parasols, and we learn that they adjust to movement in the mountain just like tumbler toys (fig. 19). All the same, it feels safe enough to cast our gaze across the Ariel Sharon Park and towards the white city of Tel Aviv (fig. 20).

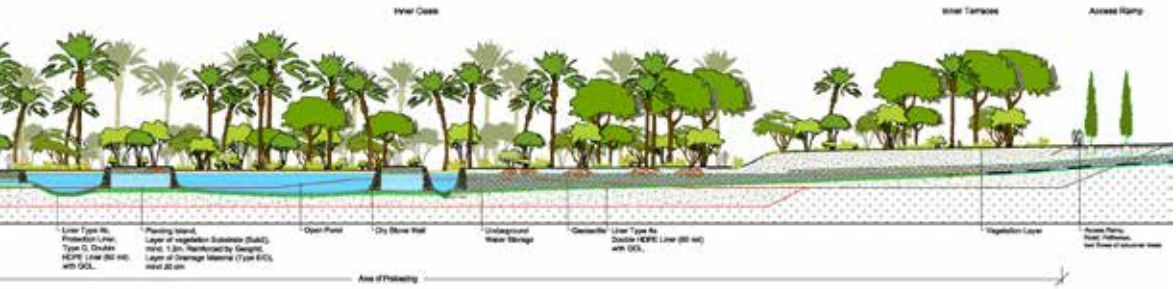
Inner Oases
Inner Terraces
Access Ramp
Open Pond
Dry Stone Wall
Underground Water Storage
Vegetation Layer
Area of Preloading

Fig. 13 – The oasis 2014 (© Latz + Partner).
Fig. 14 – The contaminated landfill - transformed into a symbol of nature and mediterranean culture (© Kobi Li).

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Fig. 15 – Future multifunctional groves in Ariel Sharon Park (© Latz + Partner).
Fig. 16 – Image of the Shapirim and Ayalon wadis (© Latz + Partner).

Fig. 19 – Approaching the Belvedere and its shady umbrellas (© Ariel Sharon Park Company).
Fig. 20 – Visitors admiring Tel Aviv's skyline (© Latz + Partner).

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Fig. 17 – Image of agricultural patterns on the foot terrace (© Latz + Partner).
Fig. 18 – Crossing Hiriya's oasis (© Latz + Partner).