

# Southern Green Line - Environmental Impact Report

## Executive Summary

### **Chapter A. Data \_ the environment the existing**

#### **1.0 Introduction**

The green line is one of the light rail lines - LRT (, planned as part of a mass transit system The passengers of the Tel Aviv metropolis, as outlined in TMA 23 /a/4. The green line connects the southern parts of the Gush Dan metropolis (Holon and the outskirts of Rishon Lezion) with the city of Tel Aviv. The line is a central component of the skeleton of the mass transit system, being a longitudinal axis that communicates with all the other transit lines, contributes to the future development of the coastal strip between Tel Aviv and Herzliya and allows access to the employment centers in Ramat Hay'il, Herzliya, ,Tel Aviv University Holon and Rishon Lezion.

This review discusses the Subtal 71 A plan of the southern section of the Green Line. The length of the Green Line in the southern section is 10.3 km in the area of the city of Holon and 4.2 km in the area of the city of Rosh Lat. The light rail route continues from the corner of Rehovot Har Zion Shibat Zion in Tel Aviv and up to the Moshe Dayan train station in Israel from the west and a connection with Derech - 412 from the east, in the area An environmental survey of 100 m from the rail axis (to each side) and a radius of at least 250 m from point components.

#### **1.2 Transportation**

The southern light rail route of the Green Line passes through the cities of Tel Aviv, Holon and Rasheltz along arterial roads, massifs and local.

The review of the existing and planned road system was done according to urban division:

- ( 1) Tel Aviv Jaffa The route runs along collector and arterial roads to which local streets drain and other collector roads.
- ( 2) Holon , the light rail route passes through arterial roads and massifs, to which main streets drain, Collectors and local.
- ( 3) Rashel Tz in both branches, the route passes through local streets, and the western branch also passes through streets gathers Local roads converge on the route of the line.

This chapter gives a description of the public transport system that exists in the Green Line corridor, and principles for integrating the system which is offered with the various public relations measures in its environment.

In addition, we will calculate and analyze existing traffic volumes. The amount of existing traffic volume is calculated by a model The transportation to the Tel Aviv metropolis of the Ministry of Transportation, which is an activity model type. The model is developed by the company Cambridge Systematics" and maintained by the Ayalon Routes company by the best experts in" the field in Israel. This type of model describes the travel patterns in detail by creating a dependency between the daily trips carried out by passengers and grouping them under one tour.

The analysis of the data clearly shows that the vast majority of the vehicles traveling on the route designated for the train Relief at all hours of the day, are private and commercial vehicles that make up 97.5% - 95.5% of the total traffic volume.

Buses traveling on the route make up 3.5% - 1.9% of the total volume of transportation and trucks make up 0.8% - 0.3% Total amount of general transportation. The analysis of the data also shows that the morning peak hours are the busiest hours.

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In the day with approximately 139,000 vehicles traveling on the roads, compared to approximately 121,000 vehicles during peak Noon hours and about 75,000 vehicles traveling during off-peak hours.

### **1.3 Soil and groundwater**

The historical survey to detect pollutants in the soil was conducted by Ron Etzion, an environmental consultant, on behalf of the "Eco Engineering" office "environment and acoustics". The survey was conducted in accordance with the guidelines of the Ministry of Environmental Protection "Guidelines for data collection Initial in soils suspected of being contaminated ( Phase 1 ) , November 2003 version.

Appendix B to the review presents the historical survey conducted along the route. Sources of contamination are indicated in this appendix. Actives and potentials of the soil, surface water and groundwater, existing in the plan area and its surroundings, their effect on The program and the ways of handling them.

### **1.4 Land uses, land designations, population density**

#### *land designations*

This chapter examined the route of the light rail in the southern section of the Green Line against the background of Tama'ot, Tammam and Be'ot. Because there are no conflicts between the above plans that apply to the areas where the light rail is going to pass, and the project himself. The TMA's that were surveyed are:

- 1. TMA 35 Textures** From the blueprint of the plan it appears that the entire route of the railroad is planned to pass through an urban texture .
- 2. TMA 35 Environmental Guidelines** From the outline of the plan it appears that the majority of the railway route is to go all the way through water resource conservation areas.
- 3. TMA 8 The national outline plan for nature reserves and national parks on the light rail route and in its vicinity** Nature reserves or national parks.
- 4. TMA 22 The national outline plan for forests and afforestation on the light rail route and there are no areas around it intended for forestry or afforestation.**
- 5. TMA 34 /b/ 3 Partial national outline plan for drainage and streams** Most of the light rail route is planned to pass through the area defined as " high groundwater vulnerability (A)" . The northern part of the route as well as the southern part of each of the arms, is planned to pass through a sensitive area for the introduction of surface runoff into groundwater.
- 6. TMA 3 National outline plan for roads** From the outline of the plan it appears that the light rail route is planned to cross Fast roads at the following interchanges: in the area of Holon Interchange, Holon Mizrah Interchange and Menachem Begin Interchange. Along a short stretch of road, between the Holon Interchange and the intersection with Sokolov Street, the train route is planned to pass on a common route with Levy Eshkol St. and Kogel St. which is defined in the TMA as a "regional road".

**7. TMA 23 National outline plan for railroads** From the outline of the plan it appears that the northern part of The light rail route is planned to run parallel to the multi-track railway, and near the Hagana station. also, In the Holon Interchange area, the route crosses a double railroad (Tel Aviv Holon Railroad). This track passes in a bridge above the level of the existing road. The southern part of the western arm, in the Menachem Begin interchange area, It is planned to pass parallel to the railway line that runs between the Ayalon routes.

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**8. TMA 23 /a/ 4 National outline plan for a high-passenger transportation system (Mat'an) in the Tel Aviv metropolis** From the draft of the plan it appears that the green line of the light rail is planned to cross or meet with A number of other bus lines at selected locations along the route.

**9. TMA 4 Change 2 ( partial outline plan for Ben Gurion Airport) building height restrictions** from the outline In the plan, it can be seen that the northern part of the light rail route, as well as a significant part of the western arm, They are planning to move in the Mangala area (construction restrictions plain).

**10. TMA 4 Change 2 ( partial outline plan for Ben Gurion Airport) noise complexes** from drawing The plan shows that the southern part of the western arm as well as the central part of the eastern arm It is planned to pass through the area of the Maram 1 aircraft noise complex.

**11. TMA 4 Change 2 ( partial outline plan for Ben Gurion Airport) bird risk areas** - From the blueprint of the plan it can be seen that the entire light rail route is planned to pass through the area defined as a zone Bird risk B.

The survey sites are:

**1. TMM 5 (district outline plan for the Tel Aviv district) Land designations-** From the outline of the plan it appears that most of the route passes through an urban area with an emphasis on residences.

**2. TMM 5 (district outline plan for the Tel Aviv district) Transportation map-** From the outline of the plan it appears that most Most of the light rail route (with the exception of the western branch) is planned to run along main roads.

**3. Tamm 5 ( district outline plan for the Tel Aviv district) infrastructure map** from the outline of the plan shows that The northern part of the light rail route (in the section between Levinsky St. and south of Kibbutz Galvoit Road), and The southern part of the eastern branch (along Jerusalem Ave. in Holon) is planned to pass in the zone area sensitive to the introduction of surface runoff into groundwater (according to TMA 34 b/4). In the section of the road between the Holon interchange and Sokolov Street in Holon, the light rail route is planned to pass through the flood plain area (according to TMA 34/b/3.)

**4. TMM 5 Change 3 partial district outline plan, Tel Aviv district Park Ayalon** from the outline of the plan It can be seen that only in the area of the Holon interchange is the light rail route planned to enter the area of the TMM.

**5. TMM 21/3 District Outline Plan for the Central District-** From the outline of the plan it can be seen that only two The southern ends of the two branches of the light rail are planned to pass through the central district.

**6. TMM 21/3 District Outline Plan for the Central District Land Designations-** From the outline it appears that the arm The Mizrachi is planned to pass through an agricultural zone. To the south is the area for the institution, and to the north is an urban development area. The

western arm is planned to pass from the west and north to an urban development area. Also, the route will pass through the area Secondary metropolitan employment and in the industrial, craft and employment area.

## **7. TMM 21/3 District Outline Plan for the Central District Infrastructure and Environment**

From the outline of the plan it appears that in the crossing area of road no. 4 (the southern part of the eastern arm) and also at the connection to road no. 20 (part the southern part of the western arm), the light rail route will also cross an infrastructure strip that includes, among other things, a power line Upper, high voltage line, natural gas line and more.

As mentioned, this chapter also reviews various lawsuits that apply on or near the areas of the light rail route. In section 1.4.2.3 For this review, a table is presented that reviews the above claims. In addition, the chapter presents the planning trends which the light rail route is intended to pass through and are reviewed in section 1.4.2.4 of this section.

### *Land Use*

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In this chapter, buildings are presented for preservation in an area of up to 100 m from the track axis along the light rail route. It was found that In the area of the city of Tel Aviv there are three buildings for preservation and in the area of the city of Holon there are four buildings that are declared for preservation.

In addition, this chapter presents all the different land uses in the area of the light rail route, 100 m on each side, as surveyed In a land use survey. During the survey, which lasted over four days about 140 photographs were taken that appear In Appendix C to this review, selected photographs of the various land uses are presented.

### *population density*

This section presents the population density for the target year 2030 which is based on population density data in a district resolution. The population density growth forecast in the Tel Aviv district is based on the average growth rate in the years 1993 - 2009 and stands at about 0.64 %. The residential density for the target year 2030 is 13.1 persons per dunam Residence.

## **1.5 Appearance and function of the street**

### *The concept of urban function*

In this chapter, the urban function of the streets along the route of the southern section of the Green Line is presented. due to its length and the complexity of the route, and for ease of reading and understanding, the section is divided into ten different and distinct sub-sections from each other in their urban characteristics.

### *The street profile*

In this chapter, typical cross-sections are presented, both in the existing state and in the proposed state. From the cuts you can get an impression where The train markings on the street and how the cross section of the street will look after the project is completed.

### *Image and identity*

In this chapter, the scenic textures and open spaces that exist along the light rail route are described. Also shown Documenting mature trees along the route.

## **1.6 Noise**

This chapter discusses the assessment of noise levels prevailing in receivers that are sensitive to noise and may be affected by From the construction and operation of the light rail, on the green line in the southern section. The noise measurements were performed at 31 different measurement points After coordination with the Tel Aviv District Environmental Protection Office:

**A. 21 measurements of about 20 minutes (hereinafter "short measurement")** whose purpose is to describe the noise levels in noise receivers represent during the peak hours while referring to the results of the noise measurement at the long points.

**B. 5 measurements for about 3 hours (hereinafter "long measurement")** whose purpose is to describe the distribution of noise levels in hours the peak and is a reference point for the short measurements.

**c. measurements of about a week and a half days (hereinafter "prolonged measurement")** - whose purpose is to describe the distribution of levels The noise over the different hours of the day and on different days of the week.

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The noise levels in the existing situation, at the measured points, ranged from  $L_{Aeq}=55-76$  dB . These levels are typical for regions Busy urban areas, where the main source of noise is urban traffic noise.

## **1.7 Radiation**

During the month of April 2014, magnetic fields and electromagnetic radiation were measured along the light rail axis of the green line in the southern section.

UMG radiation and magnetic field values were measured at a height of 1 m and at a sufficient distance from transmission sources that do not characterize the The background values. The test points are selected according to sensitive land uses or uses where there are apartments .residence Sensitive places include, among others: kindergartens, clinics, schools, gas stations, centers communal and so on.

The radiation measurement points were made in coordination with the Radiation Division of the Ministry of Environmental Protection.

Table 1.7.1.2 of this review shows the magnetic field values (mG) as measured at 92 points along a route The light rail.

## **1.8 Ecology**

This chapter presents the areas where there are unique habitats along the light rail route and its surroundings.

Near the Holon intersection there are ecological ponds that are the last remnant of the swamp landscapes in the Tel Aviv area and Gush Dan. This is a complex of 4 winter pools based on excavations and depressions that used to form one large puddle and on the side The ponds are pits and eucalyptus groves. The site is enclosed between urban infrastructures (logistics center and

(area craft) and despite the high level of cattle in its surroundings, the site is a green and quiet ecological island that houses biological diversity Rich on a national scale that includes red and rare species and all this within a dense and noisy urban space.

In the various surveys carried out in the complex, 65 plant species were recorded, of which 3 are red and rare species and 3 protected It was found that the pool complex is an important habitat for animal activity with an emphasis on amphibians and invertebrates. This is one of the few sites in the area where the activity of the five amphibian species has been observed Characterizing the coastal plain area: Common Excavator, Striped Newt, Brook Frog, Green Toad, and Toad found Most of these species are in danger of extinction and it is of utmost importance to preserve their habitat. also It was found that the complex is an activity site for a large variety of poultry.

## **Chapter II detailing the reasons for the priority of the proposed plan**

In principle, the light rail route is planned to pass through the center of the right of way. Only in places where this was not possible (due to considerations) engineering, urban and traffic (or there is justification due to high demand, the route sticks to one of the sides. In addition to this, TMA a/4, a national outline plan for a high-passenger transportation system (Mat'an) in the Tel/ 23 metropolis Aviv, established an updated network of signs for a high-passenger transportation system. Any change in the light rail route (except The permitted and detailed changes in the plan compared to the TMA route constitute a deviation from the TMA).

This chapter reviews the planning alternatives to the extent that they were examined, for two reasons: when the track route deviates from to TMA 23 /a/4, and when an alternative is chosen in which the light rail is marked on one of the sides of the street and not in the center of the right of way .

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### **2.1 Examining alternatives for the track layout in relation to TMA 23 /a/ 4**

Within the Tel Aviv district, the light rail route corresponds to the route detailed in TMA 23 /a/4 throughout its entire length. On the other hand, In the area of the central district, the light rail route deviates from the TMA in the area of the Maccabim road and the Yuval junction, where it passes through the area An open farmer, north of the approved route. This deviation is mainly due to the renewed planning trends in the plan's environment, from engineering considerations and the specific geometry necessary for the trains to enter the depot, and from the need In the interface with the blue line of the Matan network.

### **2.2 Examining the micro-alternatives for the track marking**

#### **A. Ben Zvi Road**

Along Derech Ben Zvi, an examination of alternatives for the light rail route was carried out. The alternatives examined a main alignment versus a Southern alignment light rail on the southern side) or partially southern.

According to the findings of the examination of the alternatives and the average scores given to each alternative, the planning team recommends the alternative The partial south as a preferred alternative.

#### **B. Holon Junction**

The examination of the alternatives for the Holon intersection was divided into 2 possible operational phases. This phase is due to the uncertainty Regarding the eviction date of the municipal services site of the Tel Aviv Municipality, located in the southeastern quadrant of - the junction Three alternatives refer to the stage in which the municipal services complex of the municipality has not yet been vacated, and two More that refer to the phase after the evacuation.

Planning alternatives prior to the evacuation of the municipal services complex:

1. **Alternative 1 - A limited alternative( temporary route and station location)** In this alternative, light rail and two routes The ride is at the level of the existing road today. The light rail route and the western route are temporary and not correspond to a future state (final stage) .
2. **Alternative 2 - Extended alternative (final route and station location)** In this alternative light rail and two routes The ride is at the level of the existing road today. The light rail route and the western route are final and compatible You are in the future state (final phase).
3. **Alternative 2 A Expanded alternative ( final route and temporary station location)** Similar to alternative 2, this alternative Offers a light rail route and two travel routes that pass at the level of the existing road. Light rail route and location The western route are final and correspond to the future situation (final stage).

#### **Planning alternatives after the evacuation of the municipal services complex:**

.The two previous alternatives are geometrically identical but differ in their altimetric design today a route The green line passes through the center of Levy Eshkol Blvd., instead of the western route, and therefore it needs to be diverted to the west. the route including one radius smaller than 50 m (at the Holon intersection). It should be emphasized that in both alternatives a ramp diversion is necessary The descent from Ayalon North to Levy Eshkol Blvd. due to the location of the ramp on the dividers and the future transportation complex. In addition, Both alternatives do not use the preparation that was done for the Green Line under Ayalon and Israel Railways. instead of

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The light rail crossing the ramp to Ayalon South about 50 meters from the intersection, the light rail passes between the pillars of the bridge and becomes part of the junction.

**1. Alternative 1. The sinking of the western route** In this alternative, the route passes through the center of Levy Eshkol Blvd. in Holon, Pune Left towards the west, parallel to Ben Zvi St. and on its southern side, and continues to the Ben Zvi/Levon intersection. as a result Therefore, at the Holon intersection, the route separates right and straight traffic, so there is no right turn In conflict with the light rail. Further west, the route crosses the entrance junction to the Carso complex and continues Along the center of Ben Zvi Ave. In this alternative, a change in the level of the western route is required to create direct connectivity Between the Green Line station and the Israel Railway, for pedestrians. The eastern route remains the same as the existing situation. The western route is submerged and the level of the light rail station rises slightly. Pedestrians pass over the track The western one in the bridge (Dak) from the light rail station towards the camp in a direct passage without crossing roads.

**2. Alternative 2. A sunken (underground) passage for pedestrians.** In this alternative, the light rail and both tracks are at a height The existing road today. Pedestrians pass under the light rail and both tracks in the sunken crossing of the connector the eastern side of Levy Eshkol Ave. to its western side, in a direct passage (without the need to cross roads), In the spring, a lowered urban square.

The recommended alternative prior to the evacuation of the municipal services complex is alternative 2a. In this alternative, the light rail route and the movement are final and correspond to a future situation (final stage), while the location of the Holon Junction station is temporary, But it is an optimal location in relation to the existing situation and leaves an option for the location in its final location.

The recommended alternative for the stage after the evacuation of the municipal services complex is alternative 1 sinking the track the Western and this is because from an infrastructural physical point of view Alternative 1 has a slight advantage since it does not require much copying of Heavy land infrastructure and accessible to pedestrians in the transition from the light rail station to the better Israel rail station. In alternative 1, since in this alternative the pedestrians cross on one level rather than on two levels.

However, it should be emphasized that the choice of the preferred alternative, whether a temporary or final alternative, will be made in stages The building permits, according to the evacuation status of the municipal services site in question.

### **C . The "Warriors" Kogel square -**

The green line is planned to pass from the Holon intersection in the north along the Levi Eshkol axis, through HaLochem Square and continue South along Kugel Street to the city center. The Warriors' Square (Kogel) is a landmark at the entrance to the city and therefore of symbolic importance. As part of the planning, a number of traffic solutions were tested to combine light rail with vehicle traffic ,The private one in the square. The planning team examined 4 alternatives two upgraded traffic circle alternatives and two intersection alternatives news. In all the alternatives, 2 private car traffic lanes are planned on Kogel Boulevard and 3 private car traffic lanes on Shad Levi Eshkol.

**1. Alternative 1. Light rail at ground level signposted circle alternative + east-west vehicle subsidence.** This alternative Proposes to move all traffic, in a north-south direction, at ground level while crossing the square along the light rail route Passes in the center of the road and the private vehicle on both sides of the light rail. The rest of the movements will be done through the square, but in order to give A solution to the expected traffic congestion in the square is integrated with a vehicle setback in the east-west direction. As a result, An implied square alternative is obtained. The planned subsidence has a gauge of 5.5 m to allow the passage of all The types of vehicles. It includes a lane to the direction and has portals about 140 m long. The roofing section, located Below the square itself, it is about 90 m long.

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**2. Alternative 2 Alternative for a light rail traffic circle in a north-south alignment** The purpose of this alternative is to give ,Light rail has the maximum priority in crossing the square without interruptions and on a separate level, while maintaining functionality The square at ground level is unchanged. The resulting light rail settlement includes a portal approximately 160 m long Kogel St., between H. Bayer St. and the square, a portal about 140 m long along Levy Eshkol St., in front of the station The fuel and a covered section about 100 m long below the square.

**3. Alternative 3 Alternative light rail signalized intersection at ground level + east-west vehicle subsidence** This alternative includes the cancellation of Kogel Square and turning the intersection of the streets into an implied, normal intersection while trying to preserve it on the urban character of the square. In this alternative, the intersection was shifted north from the location of the existing square. diversion The intersection allows for expanded development to the sides of the existing buildings on the south side of the intersection. Similar to alternative 1,



In order to provide a solution to the expected traffic congestion at the junction, where there is an integrated vehicle setback in the east-west direction, the light rail Crossing the intersection at ground level. The planned subsidence has a gauge of 5.5 m to allow passage .All types of vehicles This settlement includes a path to the direction and has portals about 140 m long. The roofing section The one located below the intersection itself is about 90 m long.

#### **4. .Alternative 4. Light rail signposted intersection alternative in the north-south alignment**

This alternative includes the cancellation of Kogel Square and turning the intersection of the streets into an implied, regular intersection while trying to maintain the urban character of the square In this alternative, the intersection was shifted to the north in order to allow expanded development to the sides of the existing buildings on the south side of the intersection. Similar to alternative 2, its purpose is to give light rail the maximum priority ,Crossing the intersection without interruptions and on a separate level. The rest of the vehicle movements at the intersection are at ground level. subsidence The resulting light rail includes a portal approximately 160 m long along Kogel Street, between H. Bayer Street and the square, a portal 140 m long along Levi Eshkol Street, in front of the gas station and a covered section about 130 m long below to the intersection itself.

The planning team's recommendation is alternative number 3. In this alternative, it is proposed to turn Kogel Square into a slightly diverted intersection to the north and carry out a vehicle deposition in east-west directions. This solution enables the efficient functioning of both vehicle movement both the private and the light rail.

#### **d. Aryeh Shankar St., Holon**

In the area of Fichman St., at the intersection with Histadrut St., there are 2 residential buildings ("train" buildings) that exceed the right of way and leave an actual road width of about 17 m. The introduction of a curb on this street and leaving minimum traffic lanes is mandatory the demolition of the aforementioned buildings. Therefore, a preliminary examination of alternatives for crossing the route in nearby streets was carried out, For example Hankin Street. The planning alternatives that were examined as part of the preliminary examination of the alternatives were disqualified due to considerations engineering, urban and environmental. Therefore, the preferred alternative is the transition alternative on Aryeh Shanker Street, In accordance with the route approved in TMA 23 /a/4.

Due to the continuity and proximity of the intersections, and in accordance with the request of the Holon municipality, the intersections Shankar Shaprintak and Shankar were closed Bialik and a wide sidewalk was designed that serves pedestrians and commerce on Shankar St. Shprincek and Bialik streets will become combined streets with no way out.

According to the Ministry of Transport, since this section is part of the city center and the commercial area, it cannot be considered As a combined street that usually includes little pedestrian traffic. Therefore, at the request of the Ministry of Transport, an examination was conducted Alternatives for the integrated sidewalk.

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The planning team examined a number of alternatives for the combined sidewalk (the service road) in the Shprintsk Arlozorov Bialik area:

- 1. Alternative 1. There is an integrated sidewalk as a "ker"** This alternative offers a solution of an integrated sidewalk as a ker (road service) with a width of 7.8 - 9.8 m and includes expropriation from an existing sidewalk and a private surface along with the preservation of 14 trees On the eastern side of the light rail strip.

2. **Alternative 2: Converting Shprincek and Bialik streets into two-way streets with no exit in the direction of Shankar** This alternative proposes to turn Shprincek and Bialik streets into two-way streets with no way out in either direction Shankar Due to the transformation of the streets into two-stream streets, an answer must be given to the way vehicles turn on the streets.
3. **Alternative 3. Separation of the service road from the sidewalk at the expense of the trees for conservation.** The above alternative includes a Level separation between the service road and the sidewalk. As part of the alternative, a narrow traffic island is planned with a width of 1.05 m that separates the light rail strip from the traffic lane. A traffic lane is planned to be one-way, with a width of 4 m and the sidewalk is planned to be approximately 3.5 m wide.
4. **Alternative 4 Adding - 2 junctions for light rail in Shaprintsk and Bialik** The aforementioned alternative includes the addition of 2 Intersections of the light rail crossing, in Shaprintsk and Bialik, which are operated by a barrier. As a result, along Shenkar Street 5 consecutive and adjacent intersections of the light rail crossing are created (Shenkar Sokolov, Shenkar Shprintsek, Schenker Arlozorov, Schenker Bialik Schenker Mater and Migdal), which harm the operation of the light rail in this section.

The chosen alternative for delineating the western arm of the southern segment on the green line is alternative 1 starting On Aryeh Shankar St. it clings to the eastern side until Histadrut St Shprincek and Bialik streets turn For cul-de-sac/combined two-track streets.

#### **E. Fichman St., Holon .**

The examination of the alternatives on Fichman St. was divided into 2 operational phases. This phase is due to the uncertainty about The feasibility and execution date of the "Evacuation and Construction" plan for 2 "Rabat" buildings in the northeastern part of the street On Fichman St the width of the right of way is 30 m, however in the section between Histadrut St. and Cohen Mintz St. the actual width The distance between the buildings is only 20 m. As a result, the street functions with one travel lane in each direction. in the area where The road is reduced to only one travel lane, the "Evacuation and Construction" program is promoted. The evacuation of the buildings may take a long time. Since this branch of the Green Line is the most significant of the two branches in terms of demand, it was decided to examine A solution for the layout of the line .and the location of a passenger station on the street at the intersection with Histadrut St regardless of the evacuation time of the buildings.

The examination of the alternatives on Fichman St. focused on three principle alternatives, along .about 500 m (between Rachel St. and St homa and migdal, Holon ):

**1. Alternative 1 One-track alternative** The light rail route in this section includes one track for a length of approximately 150 m, two factions of R50 1/6 , two horizontal curves of 80 m and an option for one passenger station the Histadrut In the section between Rachel and Yaakov Cohen streets, the light rail route was planned in the center of the street, including 2 southbound travel lanes and one northbound travel lane. In the section between Yaakov Cohen Street and the street Maccabim The light rail route was planned adjacent to the eastern side of the street. The route includes two travel routes Towards the south and Shrut road on the eastern side of the light rail between the streets of Yavneh Maccabim. this alternative operationally disqualified.

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**2. Alternative 2 - 2 adjacent tracks** The light rail route in this section includes 2 adjacent tracks when between The rail axes have a distance of 0.20 m and are about 150 m long , and four

horizontal curves of 80M'. In this alternative, it is not possible to combine a station and the Histadrut station is cancelled. Hence the distance between stations Golda and Sokolov station is about 1100.0 m. The sections between Rachel Street and Yaakov Cohen Street and between Yaakov Cohen Street For Maccabim Street, write in alternative 1. This alternative is essentially another variation to alternative 1 and accordingly It is also not operationally applicable.

**3. ,Alternative 3 - 2 tracks of standard width** This alternative that includes two temporary tracks and a narrowing travel routes The distance between the two tracks is 3.65 m and they include four horizontal curves of 100 m. In this alternative, only a split station (stagger) can be integrated due to lack of space for platforms parallels The sections between Rachel Street and Yaakov Cohen Street and between Yaakov Cohen Street and Maccabim Street are the same as written In alternative 1.

The results of the examination of the alternatives revealed that the preferred alternative for the temporary phase is an alternative of 2 rails of standard width Both of them have one southbound lane for vehicles. In this alternative, the Histadrut station is planned to be built as a station : Split eastern platform between Cohen Heinz and Histadrut streets, and western platform between Yavneh and Maccabim streets. the distance Between the two platforms is about 110 m. This alternative is the only loop that is operationally applicable.

The alternative chosen for the final stage, after the evacuation of the buildings in question, is an alternative of 2 rails of standard width In them, with two travel lanes in each direction, a standard station south of the Histadrut intersection and a parking lane on the side the eastern At this stage the Histadrut station is planned as a split station with two of each platform planned entrances/exits.

## **F. Avraham Bar, Rishon Lezion .**

Along the street, a central alignment alternative and an alternative adjacent to the schematic western wall were examined due to the location of the complex The commercial on this page. An eastern side alternative was not examined since all the users of the line come from the west and along its entire length On the eastern side there is an urban park and as of the time of preparing the above survey, no plans have been promoted in the area construction in his area.

**1. Alternative Western side attached alternative** This alternative offers western attachment along the entire length of the section the and in the end at turn close to the side of Moshe Dayan Blvd.

**2. Alternative 2. The main alignment alternative** This alternative proposes a central alignment along Avraham Bar Street When it started from Yelidi Tehran intersection, facing west from Avraham Bar St. to Moshe Dayan St., a route was attached The track to the west side of the street to allow the light rail to have an appropriate turning radius.

The chosen alternative on Avraham Bar St. is a central alignment alternative, where the alignment becomes adjacent to the wall West, between the streets of Moshe Dayan St. and the Children of Tehran. In this subsection, the light rail route adjacent to the wall includes two lanes Driving straight, a left turn lane towards the north, three left turn lanes and two right turn lanes towards the south.

## **G. Moshe Dayan Blvd**

As part of the current planning, it was decided in the NTA to extend the line and connect it to the planned Inter Model station in the northeast quarter of the Moshe Dayan interchange, so that it will serve as a final station and connect the green, red, and brown lines -

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and Israel Railways. Accordingly, alternatives were examined for the location of the light rail route on Moshe Dayan Boulevard, Rishon Lezion. The length of the examined section is about 1900 m.

The southern side of Moshe Dayan Blvd. is characterized by a low-intensity building that is far from the road and is not accessible to it due to the presence of police officers and in the parks between the street and the houses. Therefore, at the beginning of the examination of the alternatives, this alternative was rejected, And two alternatives remain for the location of light rail in the center of the road and on the northern side bordering commercial, employment and recreation areas.

As part of the coordination of the extension of the Red Line to Rashtrapati with the Municipality of Rishon Lezion, on Rehavam Zeevi Street, was inspected. An alternative to crossing the route in the middle of the road versus an alternative to crossing the route on the northern side. After discussions and meetings. It was agreed with the municipality that the route of the red line will pass on the north side of Rehavam Zeevi Street. In a line coordination meeting. The Green and the Rishon Lezion Municipality agreed that the route of the Green Line will continue what was agreed on Rehavam Zeevi Street. and will be planned on the north side of Moshe Dayan Blvd. Therefore, the main alignment alternative was rejected.

Therefore, two alternatives were examined for the location of the route on the north side of Moshe Dayan Blvd. The purpose of examining the alternatives is to try to maximize the use of the existing road. On the north side of Sderot Moshe Dayan there are police stations that are used as parking and among them is an area that is owned by the municipality of Rasheltz which is also used as parking for all areas. Commerce, employment and recreation which border on the wall. On the southern side there are wide terraces with landscape development or Park. The examination of the alternatives focused on the issue of whether to penetrate a little into the parking areas on the northern wall and minimize the damage to the existing landscape development on the southern wall, or not to penetrate the parking areas on the northern wall at all and damage in the existing landscape development on the southern side.

- 1. Alternative 1** The purpose of this alternative is to reduce the damage to the existing scenic/acoustic development on the southern wall. In this alternative, there is an expropriation of approximately 373.0 square meters of an existing sidewalk on the southern side. The excess beyond the line. The approved right of way (which is the width of the existing road) in this alternative is 2.35 meters on the southern side and 3.30 meters on the northern side.
- 2. Alternative 2** The purpose of this alternative is to reduce the damage to the parking areas located on the north wall, but the damage to the existing scenic/acoustic development on the south wall in this alternative is great. Also this alternative is no. Utilizes the width of the existing sidewalk beyond the right-of-way line on the northern side and increases it to the south. In this alternative, there is an expropriation of approximately 1823.0 square meters of an existing sidewalk on the southern side. The excess beyond the line. The approved right of way (which is the width of the existing road) in this alternative is 5.85 – 8.65 meters on the side the southern.

The planning team chose alternative 1 as the preferred alternative because of its many advantages such as: minimal deviation beyond the line (the approved right-of-way (and they are from the width of the existing road), minimal damage to the existing scenic/acoustic development on the side the southern, utilizing the width of an existing sidewalk beyond the right-of-way line on the northern side and a small expropriation of an existing sidewalk on the south side.

## **Chapter III Description of the proposed plan -**

### **3.0 General**

The Green Line is part of the metropolitan urban system operated by the light rail train technology (LTR-light rail train) of the Matan network. This system incorporates the best of the latest technologies in planning

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The infrastructure and the Rolling stock A modern light rail system is a rail system, which is usually separated from traffic. The general road requires its own right of way and has absolute priority at traffic lights.

The southern segment of the Green Line connects the city of Holon and the outskirts of Rishon Lezion (in the west and east) with the city Tel Aviv in general and the Metropolitan Police Department in particular. The beginning of the section on Har Zion St., south of the intersection Levinsky, continues south to the Levon/Ben Zvi intersection (Abu Kabir intersection), turns east to the Holon intersection and south again on Levy Eshkol and Kogel boulevards to the old center of Holon on Sokolov Street. In this area the line splits into two arms: Western and Eastern. The western branch route passes through Shenkar, Fichman, Barkat and Ehrlich streets in the Holon area and continues on Avraham Bar and Moshe Dayan St. in Rishon Lezion. The western route ends at the Moshe Dayan terminal. The eastern branch continues from Sokolov St. along all Jerusalem Boulevards, crossing road no. 4 and connects to the road tax. 412 in front of the Volcanic Institute. The route passes at ground level and serves the employment areas of Holon and Rishon Lezion, including dense urban areas, and only in the northern part of Holon and the eastern part of Raslach passes. The line is in open areas designated for future development.

The length of the section in the Holon area is 10.3 km and in the Rishon Lezion area 4.2 km. along the southern section are planned 26 underground stations, including five "main stations" and two optional ones (in area H - 500 in Holon and Hayouval Blvd. The main stations, where a meeting is planned between the lines of a high-passenger transportation system (Mat'an) and themselves and/or a meeting with other means of public transportation are: Holon Junction, Sokolov and Golda Meir in Holon and the Moshe Dayan terminal and the Maccabim station adjacent to Route in Rishon Lezion 412.

Other system components include the Holon depot, the operational area for maintenance and the light rail stay east of the interchange "Holon Mizrah" on road no. 4, technical rooms, the energy supply system and related infrastructures such as cables, Generators and transformer stations. In a number of hubs where a traffic conflict is expected between the light rail and the traffic. The flow of vehicles along the axis, level separation is planned while giving priority to light rail. For example, this is the case in the redesign of Kogel Square, and at the Rehovot intersection

Jerusalem Ave./Solomon Bay. Another element is placed between a node Sokolov/Kogel and Avivim St. to allow trains coming from the western branch to turn eastward. The depot complex.

### **3.1 The permanent components, infrastructures and facilities along the route**

In this chapter, the engineering criteria for planning the light rail track and for determining track width, height and level are detailed. The rail, rail welding, minimum radius gradients, measures, to dampen vibrations and more.

### **3.2 Stations and facilities along the route**

In this chapter, an overview and a brief description of the stations along the Green Line will be given. The planning of the stations and their location along the length. The route was made with an in-depth examination of the range of their urban influence in the space. The range of influence around them is about 500 m as the crow flies, equal to about 750 - 800 m actual walking distance.

A total of 27 stations are planned along the section, of which 5 are main stations. The distance between the stations is about 500m. In a dense urban environment and about 1000 m at the crossing of the line in the open areas.

In general, there are four types of stations:

1. **Parallel station** A situation where the track passes between the two platforms, which are opposite each other on both sides. -

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2. **A station attached to the sidewalk**, a situation where at least one of the platforms fits into the existing sidewalk, and the track passes between the two platforms facing each other on both sides.

3. **A station at a pedestrian crossing** is a situation where the track passes between the two platforms, which are opposite each other on both sides. The station is located on a street for pedestrians only, without vehicle traffic.

4. **Stagger station** - a situation where the track passes between the two platforms, which are opposite each other on both sides and on the other. The sides of the intersection are moving.

In addition to these, this chapter presents a brief overview of the 4 level separations planned as part of project execution. The light rail in the southern section:

1. **Western route settlement on Levy Eshkol St.** This settlement will be carried out as part of the final phase of the Holon intersection. In this alternative, a change in the level of the western track is required to create direct connectivity between the Green Line station and the Israel Railway, for pedestrians. The eastern route remains the same as the existing situation. the western route. Sunken and the level of the light rail station rises a little. Pedestrians pass over the western route in the (thin) bridge. From the light rail station in the direction of the military base in a direct passage without crossing roads.
2. **The subsidence of Kogel Square, Holon** The light rail crossing at Kogel Square requires a traffic solution that will enable the integration - The light rail with the movement of the other vehicles. After examining several alternatives, it was decided to adopt the solution according to it. A level separation will be built when the light rail and vehicles in the north/south direction will continue to move on the surface of the ground and vehicles

The vehicle on the streets of Mikveh Israel/the fighters will move at a low angle, in an east/west direction.

3. **Shikou Mafaretz Shlomo St./Yerusalem Sd., Holon** The settlement at the Mofaretz Shlomo intersection is planned in the connection between Sderot Yerushalayim and Mfaretz Shlomo St. The subsidence provides a solution to the traffic load of vehicles entering from the road tax. 4 Towards Kiryat Sharet neighborhood and future neighborhoods in Holon such as H - 300 and H- 500. The sink includes a pathOne with a width of 4.5 m in traffic towards the west and has a vehicle tunnel with a length of about m 360.
4. **The Jerusalem Bridge over road no. 4** The crossing area of Yerushalayim Ave. and road No. 4 will be reorganized so that there are At the end of the construction, three bridges, two bridges for the passage of vehicles, each of them one-way, two-lane, - and a bridge for the light rail crossing which will be built between two Kr bridges. A pedestrian sidewalk is planned on the north side of The new bridge structure and a bicycle path are planned on the southern side.

### **3.3 Energy systems, related infrastructures, infrastructures and emergency systems**

This chapter presents the principles of the lighting systems (internal, external and emergency) that will be used in the light trains intended.

In addition, the chapter presents the layout of the planned technical rooms along the light rail route. along the southern section

Eight technical rooms are planned, which are usually located underground in open space available nearby

the route A technical room includes the necessary functions of power supply to the line and stations, control and communication

to operate the transportation systems. Below is the list of rooms according to their planned location:

- 1) Holon Junction,
- (2) Levy Eshkol Street , north of Kogel Square,
- 3) Gan Tomer,
- (4) The Magic Carpet Garden , near the craft station,
- (5) the depot complex,
- (6) Golda police station, near Levon station,

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(7) Sakharov station within the area of Eco Park Rashlat,

(8) The Moshe Dayan terminal of Rosh Laz.

**This chapter also presents the electrification system for the green line, which is an** overhead electrification system, which contains Launch cables and contact cables carried by individual struts (cantilevers) . The cables are not supported and not connected Nowhere directly to the buildings or to the buildings along the railway corridor. The driving force( voltage ) is 1,500 volts in direct current. This choice of the driving force level allows lower drag currents, and consequently diameters The cables are smaller, less conspicuous and cause less current-related electromagnetic interference the electric current.

Except for the overhead electrification system that will be used in this project, there are three alternatives for electrifying the light rail, without overhead electrification:

1. Use of an embedded third rail (induction or direct contact) these technologies suffer from pressures ,high mechanical and their operation is affected by stormy weather conditions such as during the rainy season in Gush Dan. installed Infrastructure for these systems costs three to five times more per kilometer of length than systems .Two-cable routines For these systems, changes to the carriages are also required and an additional cost is required For each trailer in the range of 100,000 to-150,000 euros. Also, regular maintenance costs are required In the range of 10 to 12 times compared to regular maintenance of overhead electrification systems with two cables. In light of the above reasons, none of the rail-based technologies will be adopted for the Green Line based on A third is embedded.
2. **Energy produced inside the train cars** Such energy is mainly produced by diesel electricity generators or by fuel cells installed inside the mobile equipment. Both alternatives cause problems in the operation of the wagons Because of the effect of concentrated weight on inertia. Installing machines with a rotating mechanism is also problematic at a fast pace near people traveling. Both alternatives suffer from a self-discharge problem, meaning the facility Discharges energy in about three hours if not fully activated. In light of the above reasons, none Of the above alternatives, it is not relevant for the use of the green line.
3. **Energy storage inside train cars** In this method, the energy storage is carried out inside batteries or a super Capacitors( super-capacitors ). This method has two technologies that are currently being actively tested by me Some manufacturers of light rail cars. These technologies have different advantages and disadvantages, but at this stage, And since not even one mature application exists for either of these technologies, this method will not be implemented Now on the green line. But when the product matures into production by some light rail car manufacturers, it may That the product will become usable in the future, apparently after the green line is already operational.

### 3.4 Description of the depot plan

The depot complex is a center for maintenance, operation and parking of the light rail of the green line. He centers in himself the All the buildings used to maintain the line on its mobile and stationary components, as well as all the buildings that center the The activity of the departments associated with the line operator. The depot complex includes several maintenance buildings and offices, including a building Main maintenance, whose purpose, in accordance with the 12/3 TPMM, is to provide service to the train fleet of the Green Line.

The depot complex will be built at the eastern crossing of road no. 4 on an area of about 100 dunams, adjacent to the Holon Rishon border Lezion, near the existing employment area in East Holon and the one planned in the meteorological complex. Today the area Characterized by agricultural land and dirt roads along the southern side of which passes the new rangers bridge which is part of

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From the "Holon Mizrah" interchange. The area has the shape of an isosceles triangle whose base is parallel to the interchange bridge to the south, the side The eastern side is adjacent to the meteorological complex and the western side is parallel to road no. 4. to enable exit From the railway (main exit) towards Tel Aviv, the depot was designed for a height of about 36.00 meters to match the height of the bridge Passing over Highway 4 towards Jerusalem Ave. It will probably be necessary to fill part of the depot area to a height of approx. 36.00 meters. It is important to note that the height of road 4 that exists near the depot is around level, + 27.50 therefore the retaining wall which will be required between road 4 and the depot will be at a height of about 9.0 m.



The complex is built in a way that makes it possible to accommodate the planned train fleet. The depot complex will be able to accommodate 60 cars m long light rail each, or alternatively 30 37.5 m long trains. The total planned train fleet in the railway housing 75 stands at 49 light rail cars + 8 cars that are operational reserves. The size of the train fleet at the depot is calculated according to Passenger forecasts for 2040. According to the NTA decision, the depot buildings will be built according to the principles of green construction.

The depot complex includes the following buildings and facilities:

- 1) bypass track,
- 2) sand filling/testing area,
- 3) washing area,
- 4) a light maintenance garage containing 3 tracks (option for an additional track in the future) and a maintenance structure,
- (5) a storage area (train accommodation) containing up to 30 trains (60 cars) and an option for 18 additional trains (36) wagons(,
- 6) area MOW ,
- 7) a test track about 1000 meters long,
- 8) a parking area of up to 220 parking spaces,
- 9 Tahmash,
- 10) Administration structure.

### **3.5 The mobile component of the train –**

This chapter details the technical parameters according to the updated design standards of the National Disaster Response Force, as of this stage of the design of the light rail, which include types of wheels, brake system, speeds and noise level from mobile equipment.

### **3.6 Track laying works**

This chapter deals with several sub-topics:

Relocation of existing infrastructures and laying of the required infrastructures

The establishment of the light rail project is a golden opportunity to improve and upgrade a large number of infrastructures along the route .for the benefit and well-being of the city's residents The operations for the evacuation and copying of existing infrastructure systems for the purpose of evacuating the route ,intended for light rail, require many inputs and resources. Therefore locating the location of systems is of great importance These and to assess the complexity of copying them, if they are on a route intended for light rail. due to the need for a leash Sterile of infrastructure lines, all the infrastructures in the light rail line will be copied. The copying of the infrastructure will be carried out by means.

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accepted for underground infrastructure works in the city, i.e. the use of backhoes and excavators for pipeline laying works in the streets, while partially or temporarily closing the work route.

Also, this chapter presents the principles for copying and handling existing infrastructures. For example:

- ( 1) Transverse or parallel infrastructures, which are located in the corridor of the railroad's roadway that is wide, will be copied and treated 9.40 m along the track and 12.50 m at stations/intersections.
- ( 2) Parallel or cross piping will be made of concrete or PVC . If it is required to design steel piping, a wrap will be done  
Appropriate internal and external with the addition of appropriate cathodic protection.
- ( 3) Outdoor infrastructures will be moved at a depth of no less than 2 m from the level of the top of the strip, in order to allow passage  
of electrical and communication systems needed to operate the train.

### *Treatment of contaminated soil*

In accordance with the findings of the historical survey described in section 1.3.1, the potential of the suspected contaminated land is focused In the eastern arm, along Jerusalem Ave., in a section that was used in the past and/or currently for industrial activity and businesses which may be a source of contamination. This is mainly the part between Hamarkaba St. in the east and Bar Kochba St. in the west. In this section, the centers of pollution from business activity in the areas in question are detailed.

In addition to the above, this section presents the accepted ways of treating excavated soil in general and contaminated soil in particular. It also presents the accepted methods for soil sampling, the types of analyzes that will be performed and other actions to be carried out for the purposes of clearing and storing the land.

### *Location of work sites and organization*

,A construction site must have a logistics rear (organization area) next to it where the offices construction materials, equipment and services will be located necessary to carry out the project. In general, it is advisable to place the organizing area as close as possible to the construction site. size  
The required area is a result of all the activities carried out in it. A total of 8 are planned along the light rail route.

Organizing sites in the following places:

1. The Groves Park, Abu Kabir Junction,
2. Herzl Garden,
3. Barkat Street,
4. Holon sands,
5. Eco Park,
6. .Moshe Dayan Ave,
7. .Jerusalem Ave,
8. The depot area.

### *Organizing website management plan*

The organizing sites that will operate for the establishment of the Green Line will be located in a vibrant urban environment and will therefore be required to comply within environmental limitations. The construction and execution stages of these sites will be formulated by the contractor who wins the tender. This contractor

Will be obliged to submit a supplementary environmental document for the approval of the Ministry of Environmental Protection and the accompanying staff, as a condition for construction the sites.

### *Temporary and permanent visual rehabilitation*

Carrying out preliminary clearing works and preparing the street surface for the arrival of the light rail is an essential principle for effective restoration of a landscape the street These operations are carried out from the outside in, including the preparation of the sidewalks for the final condition, and the preparation of the light rail dividers. The operations for temporary restoration during the works will be planned at a later stage in preparation for execution and after the selection of contractors The execution will be included in the environmental documents submitted to the accompanying team of the program. The operations for the restoration of the landscape will be conducted During the works according to the planning the final visual appearance of the area of the program.

## **3.7 Operation and traffic data for the operation phase**

This chapter presents the planning data for the number of trains and their frequency, the number of trains per hour and the total number of trains in the sections The hours throughout the day and evening for **both directions of travel**, according to the division into three different travel lines:

- ( 1) Levinsky Garden in Tel Aviv, Sokolov St. Holon, -
- ( 2) Sokolov Street from the Moshe Dayan Terminal in Israel, -
- ( 3) Sokolov .St. Hayouval St. (intersection with road - 412)

The data on the number of trains is a derivative of the three service lines that will operate along the length of the green line, from north to south. ,In addition to the scheduled passenger trains there are a number of trains that run on the tracks not for the purpose of transporting passengers ,but for operational purposes. In the time between late night and early morning, there is a window Occasions where there is no passenger train traffic on the track. This time window is used for ongoing maintenance activities the track.

This chapter also presents the planning data for the number of trains according to their types that will operate at night.

### *Principles for coordination between the light rail system and the existing and planned public transportation system*

There are several means of transportation with many passengers. The system design is one that utilizes the relative advantage of each a means. In order to increase the use of public transportation and transfer trips from private vehicles to it, it is necessary to improve The attractiveness and comfort of the pedestrian passenger. Good connectivity in moving between the means and planning as a system integrated one by one, and friendly planning of the interface points between the integrated system and the urban fabric, While placing the emphasis on pedestrians, on the other hand, they ensure a transportation-oriented development and increase the levels of accessibility.

Section 3.7.2 of this review presents the principles that will be carried out for the adjustments of the bus route system for planning The light rail system.

### *Maximum travel speed according to division into segments*

The travel speed of the light rail is often a derivative of the road route it passes and will be fully adjusted to the geometry of the track, the extent of its curvature and the road conditions. In general it can be said that the travel speed The permitted speed in urban sections is 50 km/h and 25 km/h in sections intended for pedestrians such as a pedestrian crossing.

Section 3.7.3 of this review presents a table of maximum travel speeds of the light rail divided into segments.

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### *Assessing the changes in traffic volumes along the route*

The assessment of changes in traffic volumes is based on traffic data obtained from the transportation model for the Tel metropolis Aviv (Tel Aviv model) of the Ministry of Transportation, which is an activities model type model. The model was developed by a company "Cambridge Systematics" and is maintained by Netibi Ayalon company by the best experts in the field in Israel. A type model It describes in detail the travel patterns by creating a dependency between the daily trips taken by passengers and grouping them under one tour. The model includes placing networks in the existing state (2010 network) and changing 2030 and 2040. Under the guidance of the Ministry of Transportation, this is the mandatory model for carrying out planning works - 2020 future target In the Tel Aviv metropolis, the directive applies to all government and private planning bodies.

The evaluation of the changes in traffic volumes compares two types of data: the future state of the traffic volumes without the green line and the future state of traffic volumes after the activation of the green line. The assessment of changes in traffic volumes compares two types of Data: future state of traffic volumes without the green line and future state of traffic volumes after the line is activated the green line.

From the analysis of the received data, it can be seen that a significant reduction in the amount of private vehicles will apply and the commercial ones, both in the morning peak hours and in the afternoon peak hours and in the low hours: as a result of the operation of the line The amount of these vehicles will be reduced by about 13.5% - 11% and in 39 travel segments that make up about 51 % of the total the segments. The analysis of the data also shows that the number of buses will decrease by about 50 % in most sections of the trip to all .The length of the test hours Also, the amount of trucks will remain unchanged in most segments. It should be noted that only slightly An increase in the number of private and commercial vehicles will apply to the tested travel segments.

### *Location of main stations*

The LRT lines in TMA 23 /a/ 4 create a network with connectivity between the Internet lines themselves and between systems Other public transportation and mainly to the railway network of the Israel Railways, which feed each other. so One of the most significant issues is the determination of main stations at the junction between the reference lines and between the middle ones the other public transport, in a way that will allow a quick and efficient passage of passengers between them. The location of The stations are determined taking into account various considerations, especially in reducing walking distances, taking into account pedestrians

pedestrians and cyclists and in coordination between all the parties that operate public transportation

" main station" as defined is a station located at a meeting point between different commuter lines and/or between means Public transportation and the Matan lines and which allows a transition between them. The main stations in the southern section of the seasons the Maccabi Yoav in Israel, and the stations Golda Meir, Sokolov, and Holon Junction.

### **3.8 Planning and execution stages**

The description of the works for the construction of the line is in principle, correct at this stage. A planned schedule will be provided during the detailed planning phase for each step .

The works for the construction of the route will include: excavation of the track strip, laying of communication and electricity lines, construction of pillars Electrification, drainage works, scrubbing and layering of the existing roads. Finally, landscaping, paving, and signage will be done and coloring.

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,The works include dismantling asphalt and pavements in the area of the route, scrubbing layering and adjusting the heights of the asphalt or The sidewalks, including copying curb stones or garden stones for adjustments. Description of the execution stages for maintenance and landscape restoration works at the time and at the end of the execution The operations for temporary restoration during the works will be planned at a later stage in preparation for execution and after the selection of contractors The execution will be included in the environmental documents submitted to the accompanying team of the program. The operations for the restoration of the landscape will be conducted During the works according to the planning the final visual appearance of the area of the program.

## **Chapter IV Detail and evaluation of the environmental effects**

### **4.2 Changes in land uses and land designations**

A vast majority of the green line in the section in question passes within the road strip of existing and planned roads and therefore for the most part It does not create conflicts with existing land uses. At the same time, there are several centers where it exists Conflict:

- ( 1) 80 Har Zion St. Conflict with the building of the Neve Yerushalayim Synagogue. -
- ( 2) Ben Zvi Street , corner of Gitti conflict with a building located within the right of way. -
- ( 3) Holon intersection , evacuation of the Tel Aviv municipality's logistics complex, shifting an existing ramp to the south, canceling a parking lot – Israel Railways.
- ( 4) Fichman Street , a future plan that will apply to a residential lot will determine the widening of a road with a width that will allow the transfer of – Two tracks, a station and traffic arrangements with the approval of the Ministry of Transportation and in coordination with the competent authority.
- ( 5) Jerusalem Ave. for the purpose of moving the light rail near Bezalel Street, the exercise of the right of way in part is required, - Conflict with private homes and expropriations are required in practice.
- ( 6) The Yuval / Derech 412 deviation from TMA - 23 /a/ 4.

### *Changes and restrictions on roads and parking lots*

Tables 4.2.3.1 and 4.2.3.2 show the change in the balance of parking spaces in the streets along which the light rail will travel and in nearby streets, respectively.

### **4.3 Changes in traffic**

The execution of the green line should be done with reference also to the needs of evacuating the infrastructures, while minimizing as much as possible the possibility of disruptions to the flow of traffic in the various areas where the construction of the line is being carried out.

This chapter presents in principle the stages of project execution during the construction phase and the manner of impact on traffic in the streets where the light rail route will pass.

In addition, this chapter reviews the changes in traffic after the completion of the project and the start of the operational phase. The impact of the transportation will be reflected both along the route of the light rail and along main roads in the vicinity of the plan. Table 4.3.2.1 in this report shows the changes in the traffic arrangements caused by the operation of the line.

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### **4.4 Groundwater and surface water sources**

The route of the southern green line is located on the coastal aquifer, a reservoir of groundwater that extends in the subsoil of a plain on the coast in Israel. The aquifer extends between sandstone and gravel over an area of about 1800 square kilometers, from the Carmel in the north to the Gaza Strip in the south and across a strip extending from the coastline in the west to 7-20 km to the east per month. In November 2014, measurements were taken of the water level in the coastal basin (coastal aquifer) by the hydrological service of Israel. From the measurements it was found that in most areas of the basin there were increases in the groundwater level.

The light rail route of the southern section is planned to be entirely underground. Rail laying works, including laying - The required bedding and infrastructure will be made to a depth of 2.0 m from the surface. Depth of groundwater along 1.6 The route of the track ranges from 0-2 m below sea level. From this it follows that the track laying works, and excavation for the construction of the technical rooms at a depth of 5 m from the surface should not lead to damage to groundwater in any way along the route.

### *Restrictions on drilling areas and shield radius*

The route of the light rail line crosses shield radii in the city of Holon in four different places while one drilling is not active today due to infection. In the city of Rashtrapati there are two drilling wells that cross the light rail route on Moshe Dayan Blvd.

The chapter presents the public health regulations (sanitary conditions for drinking water drilling), 2015, in which there are restrictions in protected areas where activity is prohibited. It also states that the health authority may, upon request, allow an exception. These regulations are based on certain criteria.

In light of what is stated in these regulations, and in accordance with the permits for the exception, it seems that there is no obstacle to the execution of the work of the plan. In the sections that cross the protective zones of the above-mentioned drillings, there is therefore no obstacle to applying for and receiving a permit accordingly to the provisions of the regulations for an exceptional permit.

## **4.5 Drainage**

In this chapter, principles will be presented for the design of a drainage system for the southern section of the green line. These principles were based on an examination of the existing situation and a proposal for a planned drainage system, so that it will be optimally integrated into the system existing and will reduce the expected changes in the drainage aspect as a result of the construction of the project and which may affect VAT Sensitive ecologies.

The planning takes into account the route of the existing drainage systems as received from various sources: the NTA, corporations. The sewage and drainage water, as well as from material collected from planners who deal with the drainage systems along the light rail route for the municipalities.

The design of the new drainage systems is adapted to the planned route of the light rail, and to the other underground systems, planned and existing along the light rail (water, sewage, electricity and communication) as well as with the overhead systems (view and lighting). The planning takes into account the future needs of the cities as received from the planning authorities. The urban and are reflected in the increase of line locomotives and coordination regarding future systems that the cities intend to implement. Along the light rail route as a function of the urban development plans.

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The light rail route runs through urban streets along which drainage systems exist. Adding the light rail is not adds paved areas beyond the existing, therefore the light rail project does not add amounts of surface runoff that should be absorbed in the drainage systems beyond the existing quantities.

As part of the detailed planning, the drainage points from the track and their connection to the existing systems along the route will be planned. The light rail.

## **4.6 Noise**

In assessing the noise levels resulting from the execution of the project, a different reference was given to its two phases: the construction phase and the construction phase activation. The noise hazards expected in each of the stages are different in nature and so are the criteria that apply in each phase.

The noise during the construction phase is noise from construction equipment and is similar to the noise caused during the construction of a new building or infrastructure works on the street.

The noise during the operation phase is traffic noise similar to road noise or train noise.

Another fundamental difference between the two phases of the project is the length of time they apply. The noise of the works is a short noise. Relatively long-term (up to a few years) while the

noise from the operation of the project is for the long term, for the entire existing duration of the project.

### *The construction phase*

The potential for noise generation as a result of light rail construction works is divided according to the nature of the work and its location in relation to For uses that are sensitive to noise near the work site. Light rail construction works, in this section is construction The train line in the ground sections - At Grade .

In the current planning phase, the progress of the works in the construction phase is not yet definitively and precisely known and will be determined at the time from the detailed planning.

The noise criterion regarding the construction works is based on the provisions of the Law for the Prevention of Hazards, the regulations established pursuant to it, Guidelines and policies of the Ministry of Environmental Protection and other sources.

In this section, the potential for noise hazards was assessed and a basket of possible solutions was given to reduce them during the construction phase.

.The review presents an assessment of the potential for noise hazards along the program's route These places will be checked individually In more advanced planning stages for the purpose of assessing the potential for possible noise hazards.

### *Operation phase*

In this chapter, noise calculations are presented according to the following two situations:

- 1) Noise calculation for the existing situation.
- 2) The noise levels in the target year with the project, in the situation where the green line will be established and will operate.

The noise prediction of the light rail and motor traffic (vehicle traffic) was conducted using two separate models For calculating noise, a model for calculating train noise and a model for calculating road noise. In this project the impact is tested the environmental impact of the noise of trains, next to the noise of motor transport. The main environmental impact originates from change in the volumes of motor traffic, due to the project and not as a result of direct noise from the light rail.

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An exception to the noise criterion was found in the noise receivers on Shankar and Fichman streets. During the detailed planning, a report will be prepared Another acoustic test in which the possibility of meeting the noise criterion will be examined, whether by treating the rail or with residential shielding.

## **4.7 Vibrations**

In assessing the vibration levels as a result of the light rail project, two phases of the project must be considered, phase The construction and the operation phase (similar to the reference to the issue of noise reviewed above). The hazards of vibrations expected in all One of the stages is different and so are the criteria that apply to each stage.



### *The construction phase*

The potential for the formation of vibrations as a result of light rail construction works is divided according to the nature of the work and its location in relation to  
For uses that are sensitive to vibrations near the place where the works are being carried out.

In this section of the green line, the light rail construction works refer to the construction of the railway line in the ground sections - At Grade .

The course of the construction works is not definitively and precisely known at the current planning stage and will be part of the planning the detailed

It is worth noting that, as a rule, unlike noise and other potential nuisances, the spread of vibrations as a result of execution Work with tools, limited to relatively short distances from the source of the vibrations.

### *Operation phase*

In order to assess the potential for the formation of vibrations as a result of the operation of the light rail, vibration propagation calculations were conducted From the planned tracks to the homes of the recipients closest to the route.

No deviations from the vibration criterion were found.

## **4.8 Electromagnetic fields**

This section includes a theoretical characterization of the safety of electromagnetic fields for humans and effects on intended uses the ground, as a result of the formation of potential disturbances in the areas adjacent to the light rail infrastructure.

The sections of the light rail along the green line were scanned to locate buildings and possible land uses ,Affected by the emissions from the overhead power lines, the catenary which feed the mobile component and the operation of the trains on the green line.

Along the route, no buildings located in the area that may have a magnetic field flux higher than 4 mG were located ( the threshold recommended by the Ministry of Environmental Protection under conditions of maximum typical load). This area is 4.5 m and is Refers to the distance measured from the axis of symmetry between the two tracks to the nearest buildings on both sides of the track. Since the instructions of the plan allow a change in the location of the track in different sections at later stages, Possible measures that can be used, if necessary, to reduce the scope of the impact on structures have been described Living from the electricity poles.

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In addition, the level of the magnetic flux outside the technical rooms located along the line was examined according to a representative plan to a technical room. Outside the walls of the room the magnetic field flux is lower than 4mG . In the areas above the ceiling of the room there is a wash The magnetic field may reach tens of milligauss at a height of 1 m above the ground, in a hidden room. in field flux levels - Such magnets do not prevent the movement and free passage of ,people above the rooms but uses are not allowed that allow the public to stay in the place such as placing benches above the ceiling of the room or people staying in the public areas above the station. The planning team recommends measures, as needed, to reduce the impact which include

among other things: magnetic shielding of the transformer cells, the cell ceiling and some of the walls with panels and insulation layers and/or internal planning and the location of the technical rooms so that the problematic elements in terms of the flux of the magnetic field will be located in areas less sensitive to the presence of people.

#### **4.9 The profile of the street and its urban function**

The effects on the nature and function of the street are presented in the "Urban "Integration document prepared for the plan by the ministry The architects "Frachi Zafarir". The measures to prevent nuisances and hazards as a result of the proposed changes in the section - The street is presented throughout chapter 4 of this review, according to the discipline of each chapter:

- (1) 4.2 Changes in land uses and land designations
- (2) 4.3 Changes in traffic
- (3) 4.4 Groundwater and surface water sources
- ) 4.5 drainage
- (5) 4.6 Noise
- (6) 4.7 vibrations
- (7) 4.8 electromagnetic fields

In addition, section 3.6.5 of this review describes the scenic restoration actions (temporary and final) that will be taken in order to Minimize negative urban effects and optimally integrate the light rail route into the existing landscape.

It should be emphasized that not every discipline is expected to have nuisances and hazards. On the contrary, the program was designed so that it would fit the itself in an optimal way to the existing situation and in some issues will even reduce the negative effects. For example, we It is expected that following the construction of the project, the traffic of buses along the routes will be significantly reduced (by about 50% ) The light rail route will pass.

#### **4.10 Ecology**

As part of the planning of the light rail of the green line, changes are being made to the traffic arrangements in the area of the Holon intersections and Winter puddles nearby. The changes, as : of this planning stage, should be carried out in two stages before the evacuation and after the evacuation of the complex for municipal services.

As part of the review, various alternatives were examined, including the location of the train station and its various facilities and an alternative location to the descent lane from Ayalon Road that connects to Levy Eshkol Boulevard. It was found that all the different alternatives that were tested are not damage the way the pools are filled. The railway infrastructure itself, which includes the track axis, stations and facilities are not affect the wide pool complex that includes the flood areas and pit areas. The railway infrastructures are located In built and fertilized areas far from the pools. These areas are not used as a source of runoff for filling the pools.