

Central Green Line - Environmental Impact Report

Executive Summary

Chapter A. Data _ the environment the existing

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 parts The southern part of the Gush Dan metropolis (Holon and the outskirts of Rishon Lezion) with the city of Tel Aviv. The line is a component It is central to the skeleton of the mass transit system, in that it is a longitudinal axis that communicates with all the lines of communication The others contribute to the future development of the coastal strip between Tel Aviv and Herzliya and allow access to the centers Employment in Ramat Hay'il, Herzliya, Tel Aviv University, Holon and Rishon Lezion.

This review discusses the sub-paragraph 71/b plan of the central section of the Green Line. The central section of the Green Line Located within the city of "Tel Aviv" and extending from the corner of the streets "Har Zion" "Shibat Zion" in the south to "Shi Agnon" St. in the north to "Yarkon". The plan includes the underground section, crossing the "Yarkon" in the bridge and" the continuation of the route above ground. (There are 8 passenger stations spread along the route underground stations, 2 ground stations, 1 station on a bridge and one station in the portal). The 4 blue line area of this section is about 5 km long.

Because the red line is promoted before the green line and as of today is in more advanced planning stages, in coordination held in front of the Ministry of Environmental Protection, it was decided that the "Karlibach" station area, known as the "Karlibach Corridor" And what is common to both the red and green lines, will be covered within the red line documents.

background maps

In this section, the plan is presented on the basis of an urban map of "Tel Aviv" "Even Gvirol" in KNM - 1: 2500 and the route of the plan is presented on a background TCA in KNM 1: 2500.

Land uses and their statutory designations

This section presents a scan of approved plans and planning trends along the route (in text and diagrams), both at the local level and at the national level.

In addition, a land use survey was conducted in the vicinity of the program from the "Kohav HaNorth" neighborhood (the northern crossing of Nahal "The "Yarkon" (and up to the "Congress street line). The survey was based on field trips conducted in the months of July - August 2013, on A recent orthophoto map and an urban map of the city of "Tel Aviv" "Even Gvirol". The survey was carried out in a strip 200 meters wide In a range of up to 100 m, to each side of the light rail axis. For the convenience of the review, the surveyed space is divided into 10 Sections, where the route from " Iven Gvirol " St. to the beginning of "Yehuda Halevi" St., constitutes the main dividing axis between the sections to the west and east of it.

Also, in the framework of the section, reference was also made to buildings for conservation according to plan 2650 B, to simplify the flooding of the "Yarkon" stream and the existing infrastructure systems along the route.

soil and groundwater

The general geographical location of the green line is in the western part of the coastal plain, in the Hikva basin of The streams Ayalon and "Yarkon". The flood zone of the "Yarkon" stream consists of a geological section of plastic clay layers Very slightly organic. These clay layers are compact and have a high grip, and a bunch is placed underneath limestone. The area close to the flow route of the stream is characterized by a massive clay deposit.

The surface along the route of the green line is flat, at an elevation of 10 - 22 m above sea level, at a distance between 900 m to 1,800 m east of the beach.

The program area is in the western part of the coastal aquifer. In some areas along the route, the aquifer is in contact with sea water (the intermediate side). The groundwater level is more or less at sea level. From experience drilling It appears that regional water absolute bromine of about + 0 to + 3 m is expected within the Korcharit sandy layers the conductivity. The tunnel section between the Levinsky and Dizengoff stations is expected to be above the groundwater level, while that the "Nordau" "Dizengoff" section is expected to be located partially, or entirely, below the groundwater table.

It should be noted that according to the draft of the national outline plan for the water sector (Tama 34 /b/4), the route is in the area ,Defined as zone A with high groundwater vulnerability and above areas sensitive to the introduction of surface runoff water into groundwater.

As part of the aforementioned section, a historical survey was conducted to locate pollutants in the soil. In this survey, sources of pollution are indicated active and potential of the soil, surface water and groundwater existing in and around the plan area and their impact on the program.

The survey revealed that the areas with the potential for pollution are focused on the southern parts of the segment such as The old central station, the garage area in the railway neighborhood .and the Hasan Arefa complex bordering on the north on Yitzhak St ."Sde " and "Gesher Maariv . Other potential areas such as the area of the "Reading" power plant and the complex "Sde" Dov" airport is outside the boundaries of the survey. Since the main potential of contaminated soils is on the shared route section of both the red and green lines, and since it is north of "Karlbach" street it is useful" The land has always been designated and actually used for residences, commerce and public buildings, it was agreed upon by the ministry For environmental protection, the historical survey for the Green Line will rely on the findings of the expanded historical survey prepared for the red line.

In general, most of the soil pollution, if it exists in the garage areas such as the train neighborhood and Hassan Arefa, There are spot infections, due to continuous local discharge, poor maintenance and the like. The resulting discount believes that the potential for the spread of soil pollution is mainly in the vertical direction (deep) and less in the horizontal direction (the spread of pollution in space) .

From a soil sampling done in 2008, in the area of the "Karlbach" station on the "Begin" road, it emerged that in this area, the owner The highest potential for soil contamination along the central section of the green line, no concentrations were found Pollutants exceeding the threshold values.

The volumes of the soil suspected of contamination and the means for "Aven Gvirol" in it are shown in chapter 3.8.1.2 of this document.

The historical survey included an assessment of the potential for soil gas pollution along the route based on the findings of gas surveys Land along the underground route of the Red Line which was carried out between 2004-2008.

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The route between Harevat St. and "Karlibach" passes through the area defined according to the environmental outline drawing for the "Even Gvirol" on the land" and soil gases as part of planning and construction procedures, December 2009 Ministry of Environmental Protection" as an area where there is an obligation Testing of soil gases.

In accordance with this and the results of the ground gas survey that was suspended for the ground segment of the Red Line, it was decided in the company N.T.A. on dedicated sealing against the infiltration of soil gases in the underground passenger stations. In addition, in the planning phase As detailed, active soil gas sampling will be performed at 3 sampling points in the area designated for the establishment of an underground station, and this For the purpose of collecting data on the concentrations of pollutants and examining the need to protect site workers during the construction works.

transportation

The light rail route runs along the city of "Tel Aviv" through arterial streets and massifs. The above street level was shown in the diagram.

.The line is planned to run alongside existing public transportation systems, buses and a rail train Service lines ,The buses in the Green Line corridor were classified into 5 groups: urban lines central block lines, lines Metropolitan lines passing through the central block, intercity lines and morning lines and morning alternatives. Also a wired network The existing public transport was shown in the diagram.

The different means of transportation complement each other and a significant part of the users of the line will be passengers who have arrived from one of the other information systems or from one of the other information lines.

In addition, in this section, existing and predicted traffic volumes for 2020 are presented and reference is made to pedestrian traffic pedestrians and cyclists along the route.

The profile of the street and its urban function

"The vicinity of the light rail route was divided into 4 urban areas: 3 areas south of the "Yarkon stream and one north of it. Each space was given individual attention regarding its urban character.

As part of the chapter, a survey of mature trees was also conducted in November 2014. Its purpose was to examine the The value of the "inventory" of the trees planted in the surveyed urban environment, its influence and contribution to the streetscape and the residents .within its boundaries for the purpose of determining the interface with the Green Line light rail During the survey, all the trees were examined and surveyed in the area of the road strip individually. The tree survey refers to the areas where the green line passes at the level the ground, as well as the areas of the underground stations. The other areas, where the line passes underground, are exempt Tree survey according to the notification of the forestry official.

For the convenience of the review, the light rail route is divided into 8 sections. The survey revealed that most of the trees in the survey are valuable. Not a tall species and have a relatively small trunk diameter, so their environmental importance is not high. These trees are given Easily replaceable and replacement trees can be found in nurseries that will provide the scenic compensation for the existing trees in the field very quickly. Trees with a high species value and whose trunk diameter is small are also trees that have no justification change the planning in order to try and preserve them.

In general, along the entire route there are 227 trees of high value. In the sections north of the "Yarkon" crossing", The contribution of the trees to the streetscape is high, mainly due to their role in the urban green skeleton in general and the streetscape in particular. However, a large part of these trees are palms of various types, which can be copied relatively easily. The surveyed sections south of the "Yarkon" crossing are characterized by young trees, which were planted with the renewal of "Evan Gvirol" street

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The contribution of the trees to the green skeleton of the street is moderate. In the summary of the survey, general recommendations were also given to "Aven Gvirol" in the trees that exist along the route.

In addition to that, within the chapter, the population is shown in "Evan Gvirol" divided into local area cells and a chart, Cf "Evan Gvirol" population along the green line, for the target year 2030 per 1 square kilometer.

Noise

This chapter discusses the assessment of noise levels present in receivers that are sensitive to noise and may be affected

From the establishment and operation of the light rail on the green line in the central section. The "program goes through the streets "Eben Gvirol, "Karlibach", "Begin" and "Har Zion" boulevards, these streets are central streets in the city and the main source of noise. And the dominant thing in these streets is the noise of the existing transport.

In order to characterize the existing noise levels, measurements were conducted according to the road noise measurement methodology. And also noise measurements for long periods of time in order to characterize additional noise sources. Noise measurements were conducted in 16 points along the route, as follows:

At 3 points, prolonged noise measurements were conducted, for periods of time of about seven days, for the purpose of describing the distribution of levels. The noise over the different hours of the day and on different days of the week.

At 2 points, noise measurements were conducted for long periods of time of about 3-4 hours with the aim of describing the distribution of levels. The noise at peak hours. These measurements are a reference point for the short measurements.

At 11 points, noise measurements were conducted for short periods of time, of about 20 minutes each, with the aim of describing levels. The noise in representative noise receivers during the peak hours of vehicle traffic on the road while referring to measurement results. The noise at the noise measurement points for long periods of time.

The noise levels in the existing situation, at the measured points, ranged at the peak hour between $L_{Aeq} = 63-77$ dB, these levels are typical of busy urban areas, where the main source of noise is urban traffic noise.

Chapter B. Detail _ the reasons To Add " Iven Gvirol " the program offered

The planning of the Green Line is based on the route approved in TMA 23 /a/ 4. The route has no different location alternatives but Only "micro" alternatives, within the approved strip. The only deviation from the TMA takes place in the labeling On "Begin" and "Hashomaron" streets.

In general, the light rail system is designed as a ground system. Only if the ground marking is problematic, from the side the transportation and/or the urban, the possibility of laying out the light rail underground is being considered. In some sections of the line The Green found that in the ground alternatives the width of the right of way does not allow maintaining the width of sidewalks and paths Adequate bicycles alongside maintaining an adequate level of service for motor traffic. In accordance with the requirement of the "Tel Aviv" municipality, And due to the movement restrictions, it was decided to recommend an underground alternative in these sections.

The route is divided into 3 sections, for each of which an examination of alternatives was conducted:

- 1) from Shi Agnon Street to Shimon Hatarsi Street,
- 2) On " Ebn Gabirol " Street , from "Shimon Hatarsi " Street to "Yehuda Halevi" Street. -
- 3) From "Yehuda Halevi" street to " Shivat Zion" " .

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The section that runs through "Begin" Street and the "Karlibach" station is part of the detailed planning of the Red Line and therefore this section Not included in the examination of the presented alternatives.

: The criteria for analyzing the various planning alternatives include a wide spectrum of fields transportation and traffic, Urban aspects, landscape and environment and engineering. The resulting overall picture graphically maps the benefits and the disadvantages of each alternative and enables an effective evaluation. In examining the criteria and weighing the indices For the selection of the selected alternative, it was decided that no different weight will be given to each criterion. The possible score for all Criterion is on a scale of 1 to 5 from the least good to the best.

Not all the tested parameters were the same throughout the section. A distinction was made between examining alternatives and the subsection ground and the ground segments, according to the criteria required for their examination. while in segments In the underground, emphasis is ,given to examining alternatives in the environmental urban aspect, in the underground segment emphasis is given to the engineering aspect.

In addition, an examination of alternatives for the location of the passenger stations as well as the methods of constructing the tunnel was also conducted.

Results of the examination of the alternatives

In the northern part, a lateral alternative was chosen in which the light rail will run on a lateral route towards the west. Crossing the "Yarkon" will do On a separate bridge for the light rail. The crossing of Sderot "Rokah" will also be done on a separate bridge for light rail, which will end at " the station which is planned next to the future transportation center. As a result, the Rokah " station will be a station on a bridge.

In the central part, an underground alternative was chosen in which the portal is located north of Nordau" street, and a light rail passes" - along " Ibn Gvirol " street in a pair of tunnels under the center of the road. Therefore, most of the streets have several lanes The trip remains unchanged.

In the southern section, an underground alternative was chosen in which the route goes through the "Begin" road, south of the railway junction and continues to "Hashomaron" street. The portal is located south of Levinsky Street. A sunken and open passenger station (without a roof) is .planned north of "Levinsky" Street, further down the portal. In this situation, on "Har Zion" Blvd Driving at the road level, leaving two driving lanes on the western side and a single lane on the eastern side. this alternative Constitutes a change to TMA 23 /a/4.

.The location of the passenger stations is derived from the horizontal marking of the light rail Depending on the label selected, stations The passengers chosen to get up along the route are from south to north)):

- (1) The "Levinsky " station (main station) will be located north of the "Levinsky" intersection as a continuation of the "Levinsky" portal. This location maintains good connectivity between the purple line and the green line.
- 2) Karlibach " station (main station) a station in a joint underground building with the Red Line". -
- 3) Dizengoff" station is located south of "Dizengoff" street with good connectivity to all centers" in the vicinity. -
- 4) The "Rabin" station is located in front of the "Rabin" square, close to the city hall building and the center of the city park. -
- 5) .Arlozorov " station (main station) is located on " Iven Gvirol " St. , north of "Arlozorov" St" Location
This creates good connectivity of the green line with the purple line.
- 6) "Nordau" station is an underground station located on " Iven Gabirol " St. , north of "Nordau" Boulevard, in the center the traffic lane.
- 7) "Apothecary ("Reading") station , a station on a bridge located next to the future " transportation center.
- 8) " Shi Agnon" station, an underground station

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The examination of the alternatives for the section of the tunnel in the "Karlilbach Corridor" is detailed in the framework of the environmental impact review of the red line. Therefore, the examination of the alternatives for choosing the method of constructing the tunnels focused on the section between " Ivn " Gvirol " to "Karlilbach .

The underground section Ibn Gvirol "Karlilbach" starts from the intersection of the streets Nordau" " Ebn Gvirol " and continues until" "To the end of the level separation at the "Karlilbach junction for a length of about 2600 m. The total length of the tunnel is 2,350m (when the underground stations and portals are calculated separately. Examining the work methods for mining the tunnels of the aforementioned segment focused on 3 mining methods:

- 1) Mining using a mining machine - Tunnel Boring Machine (TBM)
- 2) Mining using the "dig and cover" method - C&C (Cut & Cover)
- 3) Mining using a tsm - New Austrian Tunneling method) NATM .)

At this stage, the planning team recommends theTBM method for the construction of tunnels and the C & C methodfor the construction of the stations The undergrounds and the portals.

It is important to note that the work methods and execution stages in this section will be determined in the detailed planning stage.

Chapter C. Description of the plan offered

Description of the program

The central section of the Green Line stretches from "Shivat Zion" St. in the south to "Shi Agnon" St. in the north of "Yarkon", and includes Crossing the "Yarkon". This section, which extends for about 5 km, is divided into three sub sections:

Northern sub-section: ground section that includes the crossing of the "Yarkon" stream and Rokah" boulevard at the bridge and the side marking on the "street Shi Agnon" where a final" station will also be located at this stage. An operational element called the machine will be built next to the station "pocket track " whose purpose is to regulate traffic and to allow the light rail to turn back to the south. In the future the line will continue North of Herzliya. Another branch will continue to the east, towards the " Atidim " employment area in Ramat Hayyal.

Central sub-section: the section from the "Karlbach" station north along "Karlbach" St., the Karlbach"/ " Yehuda " intersection" Halevi " / " Iven Gvirol " along " Iven Gvirol " St. to the corner of "Shimon HaTarsi" St. next to the "Nordau" Portal. Most of it is underground and consists of two parallel and separate tunnels connected by 9 passages emergency. The main "tunnel route was opened to three underground stations "Dizengoff", "Rabin" and "Arlozorov. Further north of the portal, in the ground part, the "Nordau" station is located.

Southern sub-section: the section connecting the ground route through the "Lewinsky" portal and the continuation of the sub"Ground up to the intersection of the streets via " Menachem Begin and " The Train " . The section includes the "Levinsky" station, located in the The sunken of the portal.

"Crossing the "Yarkon:

The green line will cross the "Yarkon" stream on a bridge designated for light rail that will be built between the "Bar Yehuda" bridge and the " Osishkin". The length of the bridge is about 155 m with a height of 8.14 +. The bridge will pass over "Bnei Dan" street, over a stream The Yarkon" and parallel to " Ibn Gvirol " street . The bridge will be built "in the spirit" of the "existing "Bar Yehuda" bridge that passes over the "Yarkon And later it will connect to the bridge over the " Rokah axis ".

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Adjacent and west of it, a bridge to the sidewalk and a bicycle path are planned in order to create continuity of the walking paths and the bike ride. Later, the walking route descends to the ground level to the junction " Iven "Gvirol " / "Rokah.

The fixed components

The planning of the railway line is based on the standard planning documents received from the Ministry of Transport and Communications DSM - NTA Design Standard Manual . The section presents the engineering criteria for route planning the track and the station platforms.

Stations, infrastructures and facilities along the route

"passenger stations are planned along the route. The stations "Karlibach", "Dizengoff", "Rabin 8 and "Arlozorov" are sub Grounds, the "Lewinsky" station is submerged in a portal but open to the sky, the "Rokah" station is located on a bridge and the rest located on the ground.

The location of the stations is not final and may change during the detailed planning phase.

"In general, all underground stations are a two-level structure inside a "box" made of "salary walls and/or Evan Gvirol", as shallow as possible, with 2-3 entrances . The entrances to the" underground stations are located on the sidewalks, Squares, nearby parking lots and buildings, in coordination with planned projects and existing buildings.

The platforms of the ground stations consist of the following parameters: a divider and a railing m) + a strip of facilities (0.30 Along the platform (0.90 m) + curb (0.70 m) + area free of obstacles m 1.3)).

The minimum width of the platform is 3.2 m and in those cases where the number of people boarding/disembarking requires a width Larger operational, the platform is expanded according to calculation. Generally, a platform with a width of 3.2 m is suitable for all stations In both directions with the exception of the "Levinsky" and "Dizengoff" stations, where a continuous width of 3.7 m is required in the northern direction.

The infrastructure of the underground stations includes, among other things, electrical and communication systems, an air conditioning system and other engineering facilities for their ongoing operation. As part of the chapter, a detailed description of each is given from the above systems.

tunnels

,In the area of the plan, two parallel tunnels are planned with a total length of about 4.5 km each with an outer diameter of of about 7.5 m and an internal diameter of 6.5 m. A free space is planned between the tunnels at a variable distance of up to 3.8 m.

Along the light rail tunnels, emergency crossings between tunnels(CP-cross passage) are planned to be built at a distance of approx. 250 m between the passages.

In the detailed planning phase, the execution method of the tunnels and link tunnels will be determined.

This section details the process of mining the tunnels in the three work methods examined in chapter B and the systems The temporary help needed for this.

In addition, reference was made to problems related to soil and soil pollution and prevention of groundwater pollution.

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portals

The portals are passages that connect the ground part to the underground part of the rail tunnels. - The portals are planned to be built on " Eben Gvirol " Street , north of "Nordau" Street, and on Har Zion" Boulevard, south of the street" Lewinsky". The position of the portals is determined" between the intersections, so that there is no need to cut or cancel crosswalks. This location Does

not affect pedestrian traffic in the street beyond adding width to the road, as for the entire length of the route.

In the early planning stage, the planning team recommends building the portal structures using the - C & C .

In this section, cross-sections of the finished " Gvirol stone" in the portals are shown and a detailed reference is made to the scenic "Gvirol stone" in the doorways the tunnels.

Energy systems, related infrastructures, infrastructures and emergency systems

In order to meet the basic needs necessary for the functioning of the light rail, the operation of the information system requires, among The rest, the existence of an energy system, associated infrastructures, emergency systems and more. In this section the systems are detailed And the infrastructure required to operate the green line: lighting, electrification, technical rooms, fire fighting and more.

It should be emphasized that with the progress of planning and development of future technologies, there may be changes in the indicated systems above. These changes "Aven Gavirol" were recorded in the execution documents upon request.

The mobile component of the train –

This section specifies the technical parameters that have environmental effects. The related effects The mobile technical parameters of the light rail mainly deal with the acoustic issue.

As part of the chapter, she also gave detailed reference to the wheels, the braking system and the speed of travel.

Construction works

,The works required to establish the components of the rail system include, among other things the relocation of existing infrastructures and laying new infrastructure. This copying is also carried out for the wet infrastructures (water lines, sewage and drainage) and to the land infrastructures (power lines, communication and lighting). These infrastructures can be underground or underground Grounds. In this section, an explanation is given for the nature of the necessary copying, the principles for copying and the "Iven Gvirol" in the infrastructures ,exist and principles for laying new infrastructures required to operate the light rail.

Since most of the route goes underground and so do the infrastructures that use it, the "Iven Gvirol" procedure is presented in contaminated soil (if it is discovered during the construction (works. Sampling and evacuation of the excavation, storage, transport and evacuation of contaminated soil and more.

.During all phases of the construction work, work and organization sites must exist in the area That is, a construction site ,Must have a logistics hub nearby (organization area) where the offices construction materials, equipment will be located and the services necessary to carry out the project.

The main structures for this are the tunnels, the underground stations, the portals and the shipping shafts. In general, It is advisable to place the organizing area as close as possible to the construction site. The size of the required area is a result

of all the activities carried out in it. In this section, examples of the location and layout of organization sites are presented, Development and principles for visual rehabilitation and maintaining proper urban functioning and reducing harm to its residents.

In the detailed planning phase, alternatives will be examined for a logistics organization close to the shipping shafts, according to the methods Excavating the tunnels you choose for each section of the underground route of the Green Line.

As part of the episode, reference was also made to the issue of the scenic restoration of the organizing sites and the issue of preservation
The normal functioning of the city and the reduction of harm to the residents during the execution of the construction works.

Operation and traffic data for the operation phase

The movement of trains along the green line is carried out on several service lines. The central segment is the common segment to these lines. Therefore, the train movement data for this section is derived from the total number of possible movements along the length of The green line. In this section, the number and frequency of trains, the speed of travel divided into sections and expected changes are presented in vehicle traffic volumes alongside principles for coordination with other public transport agencies.

drainage

The light rail route is based for the most part on existing roads and paved roads, without new paving of areas open, dirt roads, etc. The development and execution of the project is not expected to produce amounts of runoff beyond the amounts generated today and is not expected to affect the general amount of drainage. The drainage works will include copying and diverting drainage lines From the field of work without changing the flow chart.

In addition, the municipality of "Tel Aviv" "Even Gvirol" demands that during the construction of the project, a number of drainage lines will be increased and in some of them even The diameter of the line, and hence the development of the light rail in the city benefits the municipal drainage system.

The light rail tunnels will be drained to the stations closest to them. The portals and stations will concentrate the runoff water in their area By "Even Gvirol" floors that will direct the water to drainage channels that will be located at the lowest points. At the stations Sewage pumping facilities will be installed in the Levinsky, Arlozorov, Dizengoff and Rabin underground stations.

planning and execution stages

In the early planning stage, it is possible to describe the execution stages for the establishment of the green line project and the central section In particular, in an inclusive manner only. A detailed description and presentation of a planned schedule for each phase will be carried out in the detailed planning phase

The planning team recommends doing the stations in stages (each one separately) in order not to close the entire" Evan Gvirol " street . In addition, it is recommended to first build the designated bridge for light rail to cross the "Yarkon" stream because this bridge stations) along .Iven Gvirol " St "

During the permits phase, the traffic arrangements that will be implemented in the intermediate phase will be decided and therefore a detail of this phase will appear in the environmental/movement documents for execution.

In the detailed planning stage, the performance stages for the landscape restoration works will be determined both during construction and at the end of execution the jobs.

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Chapter D. Detail _ and the assessment of the effects the environmentalism -

Changes in land uses and land designations

For the purpose of analyzing the expected conflicts with land uses in the land of the light railway and its facilities, they were divided. These properties are divided into four main areas:

- 1) The ground area from the beginning of the route to the "Nordau" station,
- 2) "The station areas in the underground area: "Arlozorov", "Rabin", "Dizengoff", "Karlbach and "Levinsky " stations,
- 3) Karlbach" vestibule",
- 4) From the "Lewinsky" portal and south.

The main expected conflicts are centered on required traffic arrangements in the area of the portals and stations, in the "Karlbach" corridor (Beit Eliyahu and Beit HaTovah) and "Shi .Agnon" street ("the municipal kennel") Mostly underground, no restrictions on land use are expected, with the exception of restrictions on the access system to the center for road safety. In ,some areas around the planned stations expropriation are even required .

At the same time, changes and restrictions are expected in the roads and parking areas in the area of the entrances to the "Rabin" underground stations and Dizengoff and in the ways where the light rail label crosses travel routes.

In the detailed planning phase "Evan Gvirol" possible alternatives to reduce negative effects and limitations, if any, were listed. In the land uses and designations, a light rail route passes near them.

Changes in traffic

In the current planning phase, the traffic arrangements in the construction phase are not definitively and precisely known and are a derivative action. From a more advanced planning phase, after choosing the work method for mining the tunnels of the underground route.

It should be emphasized that in a vibrant and developing city like the city of "Tel Aviv" "Evan Gvirol", the implementation of traffic changes and traffic arrangements throughout. The city happens frequently.

The negative effects on traffic and accessibility during construction may stem from three main sources:

- 1) Movement of trucks and IEDs at the work sites, between the work sites and the organizing sites and especially in the station area.
- (2) Changes in traffic arrangements on the main roads (" Iven Gvirol " , "Mount Zion", etc.) and diversion of traffic to the roads. Alternatives.
- 3) Blocking entrance to parking lots, sidewalks and canceling bike lanes.

4) The planning of the traffic arrangements for the construction phase will be done in the construction permit phase and in coordination with the traffic sign authority.

In order to assess the negative effects during operation on traffic and accessibility (including accessibility for .riders ,Bicycles and pedestrians (along the ground route of the central section the route is divided into 3 ground sections (from north to south):

- 1) Shi Agnon" " Ibn Gvirol " , including crossing the "Yarkon" stream "
- 2) Ibn Gvirol ") After crossing the "Yarkon" stream (Nordau portal) "
- 3) "Portal "Lewinsky" Sderot "Har Zion

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The only place where negative effects may arise in the context of pedestrian crossing along the street is Nordau" portal area. In this section, there is a problem with the width of the sidewalk" remaining between the travel lanes and the arcade the existing.

At the same time, it should be emphasized that the passage of pedestrians is also possible along the arcade, and therefore we expect the effect A minor negative on pedestrian accessibility in this area.

Groundwater and surface water sources

The route of the central section is located in the area above the coastal aquifer. The tunnel sections and "boxes" The stations are in the upper 0 - 10 meters of the aquifer waters. The Green Line tunnels are mainly located In the soil route, a gravel pit consisting of two types: a rocky gravel pit and a sandy gravel pit, in the transition medium between them.

No effects are expected as a result of the construction of the track on the "Yarkon" stream since the track will be laid after the construction of the bridge Dedicated to light rail. Also, no effects on groundwater and surface water sources are expected as a result of implementation The track at ground level.

In the detailed planning phase, after choosing the work methods for the mining of the light rail tunnels and the construction the boxes of the stations and portals, an assessment of the effects and risks on the groundwater will be carried out.

drainage

During the construction works and during the operation phase, there will be no change in the flow scheme from the current situation. development and execution The project is not expected to generate amounts of runoff beyond the amounts generated today and is not expected to affect the amount of drainage the general, in the field and outside the boundaries of the program.

In addition, since the entire flood plain area of the "Yarkon" stream is being developed, either for the benefit of the park or as part of development The North Star neighborhood and the facilities in the area of the "Reading" parking lot, and since the track passes through this section with overhead markings, no Blockage of the track is expected as a result of flooding and no changes are expected in the existing drainage system in the vicinity The river, within and outside the boundaries of the plan.

Noise

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

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 in the street. While the noise during the activation phase is transportation 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.

Noise during the construction phase:

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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, and for noise-sensitive uses near the place where the works are being carried out. Light rail construction works, in the aspect of formation and noise propagation, are divided as follows:

- The construction of the railway line in the ground sections - At Grade
- The construction of the railway line in the transition from the ground sections to the underground sections (the portals) and the stations.
- The underground mining procedure using the TBM and or the NATM method.

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 during 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 by virtue of it, guidelines and policies of the Ministry of Environmental Protection and other sources. And therefore, in this section an assessment of the potential for noise hazards was made and a basket of possible solutions was given to reduce them during the construction phase.

Noise during operation:

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. Most of the environmental impact is indoor. In the change in the volumes of motor traffic, due to the project and not as a result of direct noise from the light rail.

The noise calculations were made for the two areas where the train is on a ground route, where there could be an impact Acoustic for light rail on the surroundings: in the northern part from Shi Agnon" street to the "Nordau" portal and in the southern part" From the Levinsky portal to the Tel Aviv border on Har Zion Street.

In accordance with the directive of the Tel Aviv Council, measures must be taken to reduce noise if the noise level from light rail traffic increases on the highest value of:

A. For a residential building:

- Noise level equivalent to daytime hours (06:00 - 22:00) outside the building, **L_{day} = 65 dB(A)**
- Noise level equivalent to night hours (22:00 - 06:00) outside the building, **L_{night} = 55 dB(A)** ,

For a public building sensitive to noise - 5 decibels less than allowed for building B.

B. The noise level calculated according to the background noise to be determined through a calculation based on the situation the existing

Transportation noise levels in the current situation:

- (1) In the North Star neighborhood, the noise levels range from 61-64dB(A) during the day to 55-58 dB(A) during the night
- (2) in the north " Iven Gvirol " noise levels range from 71-78dB(A) during the day to 65-72 dB(A) during the night
- (3) In "Mount Zion" the noise levels range from 67-69dB(A) during the day to 64-62 dB(A) at night.

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The transport noise levels in the existing state after the realization of the plan:

- (1) In the North Star neighborhood, the noise levels will range from 61-64dB(A) during the day to 55-58 dB(A) during the night
- (2) in the north " Iven Gvirol " noise levels will range from 70-77dB(A) during the day to 64-71 dB(A) during the night
- (3) In "Mount Zion" the noise levels will range from 69-70dB(A) during the day to 64-65 dB(A) at night.

The noise levels as a result of the movement of the trains will be:

- (1) In the North Star neighborhood, the noise levels will range from 53-54dB(A) during the day to 49-51 dB(A) during the night
- (2) in the north " Iven Gvirol " noise levels will range from 47-65dB(A) during the day to 43-61 dB(A) during the night
- (3) In "Mount Zion" the noise levels will range from 59-62dB(A) during the day to 55-58 dB(A) at night.

No deviation from the noise criterion was found in all the noise receivers tested.

vibrations

Assessing the vibration levels as a result of the light rail project, two phases of the project must be considered: the construction phase and the activation phase. The expected vibration hazards in each of the stages are different and so are the criteria that apply in each phase.

The potential for the formation of vibrations as a result of construction work is divided according to the nature of the work and its location, and for the uses that are sensitive to vibrations near the place where the works are being carried out. The construction works are divided as follows, in terms of the formation and propagation of vibrations:

- The construction of the railway line in the above ground sections - At Grade .
- The construction of the railway line in the transition from the ground sections to the underground sections (the portals) and the stations.
- The underground mining procedure using the TBM and or the NATM method

The progress of the works in the construction phase is not definitively and precisely known in the current planning phase and is part of the detailed planning

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.

The execution of the ground sections is essentially similar to the construction of a road, except for the procedure of laying the track itself. Also a procedure The laying of the track does not include abnormal activity that includes high-intensity vibrations and therefore, there is no monitoring in these sections for disturbances related to vibrations.

During the construction phase of the portals and the underground stations, the various drilling machines and digging and trenching works Caterpillars may cause vibrations, depending on the type of machine and the position of the receivers of the vibrations in relation to the place

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the job. It is expected that the duration of these works will be many months of work, so it is possible that the vibrations will be affected On getting close to the work of the heavy tools.

This section details the type and content of the execution documents that will be submitted as the planning progresses, and a basket of possible solutions If sections are found where there is a fear of the formation of vibrations that exceed the criterion.

For the construction phase, the vibration levels as a result of the passage of the light rail were calculated and no abnormalities were found from the vibrations.

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.

Along the green line, the sections of the track were scanned to locate buildings and land uses that might exist are affected by the emissions from the overhead power lines, which feed the mobile component and the operation of the trains on the line.

The threshold recommended by the Ministry of Higher Education, under conditions of maximum characteristic load, for the magnetic flux level is a flux lower than mG 4. Calculation, with a strict approach, showed that the safe range is 5.5 meters from the rail. No buildings were found Along the route that their distance from the track is less than this distance.

Also, since the instructions of the plan allow a change in the location of the track in different sections at late stages, Moreover, possible measures were described that can be used, if necessary to reduce the scope of the impact On residential buildings from the electricity poles.

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 chamber walls the magnetic field flux is lower than mG 4.

In the areas above the ceiling of the room, the magnetic field flux may reach, at a height of 1 m above the ground, in a hidden room, to tens of milligauss. At such magnetic field flux levels there is no obstacle to the movement and free passage of people above. The rooms, however, must not allow uses that require the presence of the public in the place, such as placing benches above to the ceiling of the room or people staying in the public areas above the station.

The measures recommended by the planning team, depending on the need to reduce the impact include among other things: shielding Magnetic of the transformer cells, the cell ceiling and part of the walls in panels and insulation layers and/or internal planning and location. The technical rooms so that the problematic elements in terms of magnetic field flux will be located in less areas Sensitive to people staying.

In the early planning phase, no measurements were made of the radio frequency electromagnetic radiation field outside the area. The rail (based on the requirements of the European standard) in order to check the compatibility of electronic systems to an electromagnetic field in the vicinity of the track area.

In the detailed planning stage, an electromagnetic field that meets the standard must be ensured within 10 m of the track.

This situation will not cause disruption of electronic systems from the radio frequency electromagnetic field but may cause disruption of radio receivers in modulation AM up to a range of 1.5 km.

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Interference with life-supporting medical electronic equipment in healthcare facilities is considered extremely critical. Immunity of this equipment For an electric field here V/m 3) according to IEC 601-1-2 (. At a distance greater than 10 m the electric field is lower than this. There is To consider medical electronic equipment with LCD displays that may be sensitive to magnetic field flux of mG 2. In this case, a minimum distance of 12 m is recommended between the light rail infrastructure and health institutions.

In this review, effects on underlying infrastructures such as telephone connection, internet, telco water piping, Fuel piping, gas piping, etc., which include corrosion and/or stress induction because at this planning stage there is not yet Accurate and detailed information on the location .of these infrastructures in relation to the light rail axis and the geometric relationships (distance and equivalents) of these infrastructures from the axis. If, after the end of the final planning phase, there are infrastructures that need to be addressed. They list several possible solutions.

The profile of the street and its urban function

Most of the expected visual changes in the program's environment, due to its development, are reflected mainly in the following

The construction of passenger stations and portals, especially in view of the fact that a significant part of the route is underground.

This section reviews the aforementioned facilities with an emphasis on the station entrances, and their appearance in the urban landscape, details the effects of the plan on the character and function of the street, and presents guiding principles . for the integration of light rail in the streets