Document C - Specifications for the Design, Development, Construction and Maintenance of

a Planning Platform for Public Transportation Services

1 General

1.1 The National Public Transport Authority in the Ministry of Transport and Road Safety (hereinafter: "the Authority") through the services of the Ayalon Highways Company (hereinafter: "the Company") seeks to construct an advanced platform for planning public transportation services utilizing a Supplier that will be responsible to perform a characterization, development/implementation, assimilation, and maintenance of the platform according to the specifications detailed in this Appendix.

1.2 The required services will be performed in stages (for detailing of each stage - see Sections 5-6 herein):

1.2.1 **The Characterization Phase** - and prototype preparation - in this phase, the basic services will be implemented. A phase containing a preliminary characterization of the platform as well as detailed plans for the preparation of a platform prototype and its construction at the end of this phase, subject to the Supplier's compliance with all Agreement and Company specifications, the Supplier will receive certification for the approved design (hereinafter - "The Approved Characterization").

1.2.2 **The Construction Phase** - this phase is optional and will become active according to the Company's decision and at its sole discretion. The phase will include all the activities required to obtain approval for the system's operation (including acceptance testing and the run-up process). The construction phase will be executed according to the approved characterization. In the end of construction, and subject to the Supplier's compliance with the required terms and conditions for such, approval will be given by the Company.

1.2.3 **The Maintenance Phase** - this phase is optional and will become active according to the Company's decision and at its sole discretion. The phase will begin after receiving approval for completion. In the maintenance phase, the Supplier will be required to provide maintenance services in a manner that will enable the system's proper operation, including implementation of modifications and improvements, as per the required service level.

1.3 The requirements presented in this Appendix are minimum requirements. It is the Supplier's responsibility to implement additional actions, as will be required for compliance with the Agreement's specifications.

1.4 To the extent that the Supplier has offered the best possible specifications in response to the tender, the proposals will form an integral part of these specifications. At the end of the tender procedure, the supplier's response will be attached to the specifications and will form an integral part thereof.

1.5 **The specifications' content**

1.6 Definitions

Definition	Description
The Platform	A system for planning public transportation services that will be established according to the provisions of the tender.
Core Product	A software system/product that supports transport planning as was presented by the Supplier in response to the RFP and will serve the Bidder as a foundation for establishing the platform's core.
Supplemental Tools	Software tools that will be supplied as part of the proposed solution, to support the specification's requirements.
The Manufacturer	Owner of the intellectual property (IP) rights in the core product.
Basic Information Sources	The sources of information that will be used during the initial phase of creating the platform's database, attached to the specifications as **Appendix A'.**
Additional Information Sources	Sources of information that are not included in the basic information sources and will include, for example, information from social networks, data on the use of additional means of transportation, information from transportation models, applications used for transportation purposes, etc.
The Regulator	The Public Transport Authority in the Ministry of Transport.
Service Metrics	Metrics required from the system attached to the specifications as **Appendix B'.**
The Characterization Phase/ the Basic Services	Ths phase that will begin on the date of the Agreement's signing and conclude on the date of the Company's approval to complete the planning ("**The Approved Characterization**").
The Construction Phase	An optional stage that will begin on the date of the Company's approval for the approved plan as per this Agreement, and will conclude on the approval date for project completion.
The Maintenance Phase	An optional phase that will begin on the approval date for project completion and continue until the end of the contract period.
The Project	All the activities, including the platform's characterization and construction phase, until approval for its completion.

2   <u>Goals and Objectives</u>

2.1   <u>Background</u>

2.1.1   The Ministry of Transport National Public Transport Authority is responsible for the supply of available, accessible public transportation at an excellent level of service for every citizen in the State of Israel. The Authority works toward developing and maintaining an effective and efficient public transportation.

2.1.2   The Authority detrmines and regulatescontrols, abd is respponsible for the planning, operation and activity of regular public transportat and transporta systems, at the national and metropolitan level, and any means of public transportation according to the changing needs of the economy. The Authority's activity includes, *inter alia*, approval of new lines, cancellation of existing lines, the approval of route changes, determining schedules, and operational characteristics, and more.

2.1.3   The Authority aspires toward public transportation services that will provide a quality response to varied mobility needs so that public transportation will become the preferred choice for the private vehicle passenger public. This aspiration emphasizes the need for improved service planning procedures, the creation of a service level standard, and preferential attention to infrastructure.

2.1.4   The Authority seeks to improve its capabilities to assess the layout of service lines and execute optimal planning for the public bus transportation network in the immediate/short, intermediate, and long term.

2.1.5   Consequently, Ayalon Highways Company Ltd is interested in establishing an advanced platform based on analytical tools and algorithms to plan the public transportation network in Israel with an emphasis on buses, taxi service lines, wheel-based mass transit systems, and SOD service. The system will gather the relevant information for quality and effective planning, provide tools for planning, analysis, and inquary, integrate machine learning capabilities for planning to utilize an artificial intelligence module (AI) to assess planning by-products and assist the Ministry of Transport and the Public Transport Authority in the decision-making processes to promote optimal alternatives.

2.2   <u>A General Description of the Existing Situation</u>

2.2.1   For over a decade, the State of Israel leads the public transportation development as a primary means of the transport system throughout the country.

2.2.2   The Transport Ministry, as the regulator, is among its many responsibilities, responsible for approving any modification in planning, of any dimension or size, from plans for the entire transport network until the temporary relocation of a single bus stop.

2.2.3   The planning implemented at present by transport planners in the auxiliary agencies, the Public Transport Directorate, operates for and on behalf of the Authority, and deals in long-term projects as well as day to day activity.

2.2.4 The Public Transport Authority decided to act to arrange and regulate the public transport planning, operational and monitoring process, with an emphasis on public buses, by formulating a comprehensive guideline document, which is intended to serve as a tool for all those engaged in the branch's planning and as a means that will attain unity in the planning language and service level goals, and maximum transparency in the planning process, and its by-products. Herein is a link to the guideline document:

https://www.gov.il/BlobFolder/generalpage/planning_and_oper ation_of_a_public_bus_service/he/bus_Book2016.pdf

2.2.5 The Authority uses Ms*Sql and Microsoft Power BI as BI tools. The Authority is in the process of establishing a Data Lake. In this context, data from different sources will be collected, and data betterment procedures will be implemented.

2.2.6 The main challenges in the current situation are:

2.2.6.1 **At the Information Level** - there is difficulty in attaining current data and integrating external data into the planning process; furthermore, there are issues concerning the data's quality and the correlation between them.

2.2.6.2 **At the Planning Process Level** - the process is not organized or based on current and wide-ranging databases to examine and recommend alternatives, and it is also not based on an extensive examination of the effect of planning on the overall demands. The process is implemented manually from the characterization phase through to the transfer for approval by the various relevant entities in the Authority. Therefore, considering the previous challenges, there is a lack of uniformity between different planners, difficulty in integration between planners, and the duration of the planning process.

2.2.6.3 At the tool level:

○ **Planning tools** - the existing tools provide only a partial response for planners and do not implement optimization**.**

○ **Measurement and assessment tools** - the planning alternatives are not examined according to agreed indices, and there is no objective measurement for planning, and for active lines as well as for alternatives that are not public transport**.**

2.2.6.4 **Planning product quality -** there is difficulty in measuring and auditing the quality of planning products and subsequently - controlling execution and its effect on all of the transportation uses with an emphasis on the effects planning has on the transfer of users from the private vehicle to public transportation.

2.2.6.5 **At the managerial level** - there is difficulty managing, monitoring, and controlling design work executed and examined according to objective quality parameters, including integration with parallel/additional works.

2.3 Objectives

2.3.1 **A knowledge-based, decision-supportive central planning environment** that will be utilized for the planning of public transportation services in the State of Israel will combine tools for analysis and planning based on quality parameters in a wide variety of aspects and skills of Artificial Intelligince (AI), and enable production and sharing of products with planning processes partners.

2.3.2 **A central, comprehensive, current, available, improved, integrated and multi-dimensional database** that pools all the relevant data required for planning public transportation services in Israel, with an emphasis on wheeled transportation.

2.3.3 Managing public transportation system **service metrics** at various levels, starting from the national level until the level of the individual line and activation of measurement and control processes.

2.3.4 **Support for decision-making processes -** providing tools for management, control, and insightful analysis that will assist the Authority's management in reaching information-based decisions.

2.4 The planning system's primary users

2.4.1 The primary users expected to use the system include:

2.4.1.1 The Public Transport Authority - decision-making at the macro level concerning public transportation services, including decisions on the approval of new lines or cancellation of existing lines.

2.4.1.2 The Public Transport Authority - macro aspects, approval of all plans and modifications, evaluating the quality and efficiency of the bus line system at the route, areas, and specific line-level until that of the individual line level.

2.4.1.3 Master plan divisions in the ministry's executional companies - execution of individual planning at the micro aspects.

2.4.1.4 Entities involved in modification approval - Netivei Israel, Ayalon Highways, Metropolitan Mass Transit System Ltd., and municipalities, etc.

2.4.1.5 Transportation planners in executional companies - planning preparations for public transportation services.

2.4.1.6 Planners in other field s- during the planning of urban areas, *inter alia*, assistance in determining the layout of streets, the location of bus stops, and designing accessibility to the stations.

2.4.2 The assesment is that the quantity of users in the long term is approximately 300 users, of which nearly 70 are users at Authority's HQ and auxiliary entities, and the remaining is external planners that have been authorized by the Authority.

2.4.3 As an option, the possibility will be examined to expose the design products to additional stakeholders, for example, the public, for receiving comments, and suggestions, etc.

3 Functional Requirements

3.1 A Solution Concept

3.1.1 The platform will be based on an "off the shelf" infrastructure that supports public transportation planning and is adapted to the Authority's needs. Software components will be integrated into the solution to enable the shortening of the establishment process, reduce risks, and lessen development costs.

3.1.2 All of the platfom's components will operate as a single integrated unit supportive of the requirements and specifications described in this section.

3.2 Planning Procedures

3.2.1 The Public Transport Authority is preparing to formulate a strategy for the development of a bus network in Israel. As a phase preliminary, a set of principles concerning public transportation in Israel was consolidated while creating service levels necessary to examine the quality of the existing service, the planned service, and assess alternatives (detailed in Appendix B').

3.2.2 Public transportation planning in Israel is divided into three levels:

    3.2.2.1 Systemic planning - skeleton lines in the national, metropolitan, and urban space.

    3.2.2.2 Local planning - lines in the quarter, neighborhood, employment centers, and public institutions, etc.

    3.2.2.3 Detailed planning - setting the final routes, station stops, schedule, and processing for five licensing appendices, etc.

3.2.3 Herein are the general milestones for the planning process that the system will support:

    3.2.3.1 System-wide planning

        1) Defining demands - creating origin-destination tables of <u>all</u> the trips in the planning area. The database for this phase will be processed from the data of transportation models[1], big data, and land use development plans adapted to the planning manager's goals. The processing will include *inter alia*, validation, and adaptation between the various databases.

        2) Identify travel connections in the area and demand corridors - create national, metropolitan, and urban linkage lines by the placement of the demands on the road, railroad, and public transport network. At the end of this phase, travel connections and demand corridors for wheeled public transportation will be identified.

        3) Assessing alternatives - placement of wheel-based public transportation's travel connections on a variety of alternatives for the distribution of service lines. At the end of this phase, service metrics

---

[1] National, Tel Aviv, Jerusalem and Haifa

will be displayed for each one of the planning alternatives relative to the "business as usual" alternative. The indices will contain efficiency checks, adaptation to passenger demand and needs, and a comparison between travel times relative to the private vehicle, etc.

4) Travel forecasting - the system will produce a forecast of user volume in the planned system at the lines and stations level.

3.2.3.2 Local planning

1) The local planning process will be executed like the system planning process displayed above, where the basic planning unit will be a quarter, neighborhood, employment center, public institutions. The delimitation of the local space will be based on an enveloping arterial road network.

2) Assessing alternatives - the placement of wheel-based public transportation travel connections minus the trips that are addressed utilizing skeleton lines in the national and metropolitan space on various alternatives of service line layouts. At the end of this phase, service metrics will be displayed for each one of the planning alternatives. The indices will contain efficiency exams, adaptation to passenger demand and needs, and a comparison between travel times relative to the private vehicle, etc.

3) Travel forecasting - the system will produce a forecast of user volume in the planned system at the lines and stations level.

3.2.3.3 Detailed planning

1) Pin-point planning assessment - the quality of the planning will be assessed according to service metrics.

2) Identifying weak points - the system will emphasize and focus on weak points fo a certain line or station, e.g., a discrepancy with user activity hours, slow or inefficient route segments, a lengthy distance from a demand focal point, and so forth.

3) Corrections at the line/station level - the system will suggest to the planner changes based according to the weak points it has identified so that the service metrics will draw closer to optimization.

4) Travel forecasting - the system will produce a forecast of user volume in the planned system at the lines and stations level.

5) Creating licensing appendices.

3.2.3.4 Additional emphases for the characterization phase utilizing the system

1) The planning will be implemented in a workspace, afforded the planner/planning group.

2) The workspace will contain the relevant tools and data needed to execute the planning, as detailed in the processes above, and the specifications herein.

3) The user may share the planning alternatives with a variety of entities.

4) Following the completion of the planning work - the products will be conveyed for approval by the relevant entities.

5) The planning can be executed by the planner "manually" or automatically by the system, which will propose alternatives for planning. The system will propose to the planner changes in such a manner as to draw the service metrics closer to optimization.

6) The system will provide tools for analysis and investigate the effects that the changes have on the predicted behavior of the public.

7) The system will execute optimization and calibration of its forecasting capability and the service metrics based on the data that will be gathered and analyzed in the system from changes applied in the network.

3.2.4 Planning approval

3.2.4.1 The approving entities[2] will be capable of observing alternatives, activate mechanisms for reviewing alternatives, convey comments/queries, and approve the best alternative.

3.2.4.2 The products that will be approved will be preserved in the "product's data base", and will be available for application in future and parallel planning works.

3.2.4.3 If necessary, according to the design space characteristics, and at various phases in the approval process, interfaces to relevant systems, such as approval by Netivei Israel or local municipalities, an interface for updating the GTFS system with relevant data, will be implemented.

3.2.5 Service application and operation

3.2.5.1 The planning assignments and circumstances in the public transportation field are highly varied, starting from local changes, until extensive changes at the national, metropolitan, or urban area level. A periodic assessment of the existing system's functionality and the changes required is critical to ensure that the planning goals are realized.

3.2.5.2 In general, the system is required to execute testing and control for each application from the day of its activation. System testing will be executing in an on-going manner adjacent to its activation date, after operational stabilization, and passenger adjustment.

---

[2] There can be more than one entity, for example whenever the plan affects several areas.

3.2.5.3   The scope of testing and its manner of execution will be defined as per the circumstances and volume of changes that will be applied and will be based *inter alia*, on the service metrics listed in Appendix 4, and therefore concerning compliance with the forecasts and indices of the planning system as detailed in the characterization phase.

3.2.5.4   The system will provide tools for analysis and for investigating the effects that planning applications have on public behavior.

3.2.5.5   Analyzing the applications' effects will be used to implement optimization, update service metrics, and calibrate forecasting capabilities.

3.2.5.6   The system will activate automated procedures, which will include feedback according to real-time data and planning alternatives, as per the business rules that will be defined.

3.2.6   System management procedures

The system will supply to users, who will be designated as system administrators, tools that will enable them:

3.2.6.1   Define new indices and/or update existing indices.

3.2.6.2   Absorb data from various sources.

3.2.6.3   Run data quality procedures on received data.

3.2.6.4   Manage users and authorizations.

The supplier will execute a detailed characterization of the procedures.

3.3 Solution architecture

The architectural diagram presents conceptually logical layers and their components that will **address the functional requirements as detailed in the following sections:**
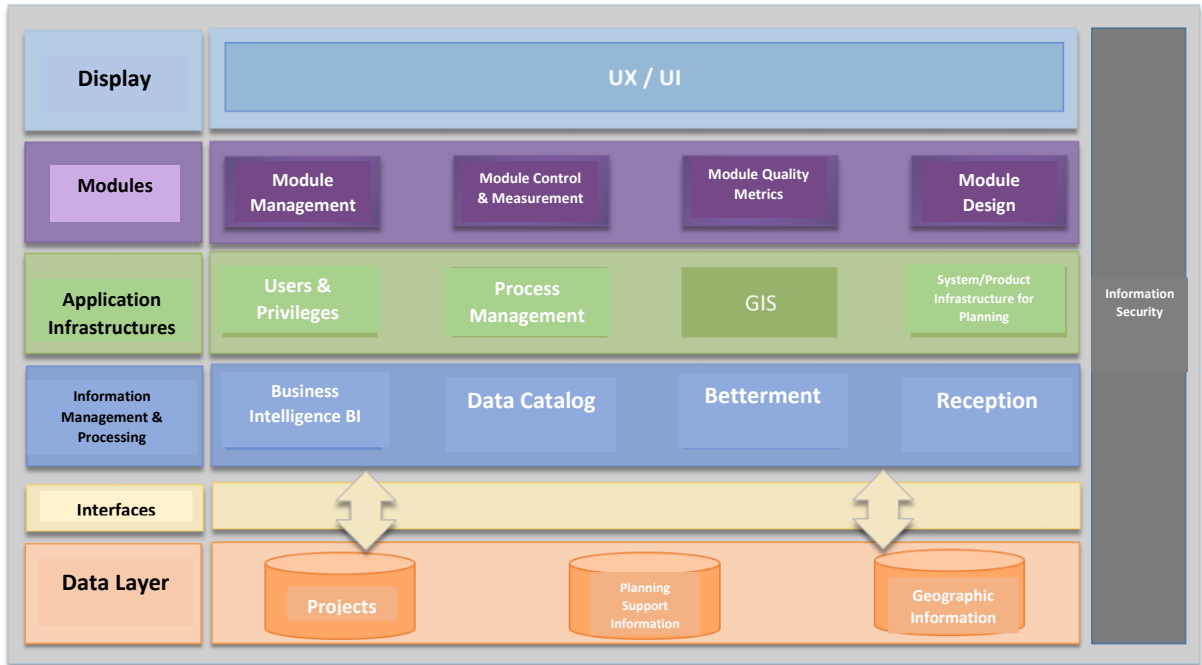
Comment: The division into components is not compulsory since it depends on the core product's capabilities and the supplemental tools; nevertheless, the platform must address the requirements presented in the specifications.

3.3.1 Modules

3.3.1.1 The module layer will include the applications/subsystems that will be used for platform users and will support the processes described above.

3.3.1.2 Design Module

This module will be a workspace for the planners and provide all the tools the planner needs to perform his work and will support the work processes outlined above, including:

1) The planner's desktop - will display to the user all of the projects in which he is involved in.

2) Create a new project/workspace for a project according to the project's type and any additional characteristics as will be determined, including partners/involved entities.

3) Determining the project's goals, target function, specific constraints for the project (beyond those defined in the full planning alignment level).

4) Gathering data from relevant sources, defining the supply and demand matrix (at the type of information and geographical cross-section level), including marking and sorting the data by parameters.

5) Defining scenarios according to various parameters.

6) Use of geographic/graphic editing tools to draw a new route or update an existing route.

7) Spatial analysis between different layers of information.

8) Carry out the optimization of data and processes.

9) Forecast and propose planning alternatives automatically while combining computational learning capabilities (AI).

10) Examine alternatives vis-a-vis selected service metrics.

11) Carry out statistic processing, including regressions and analysis of variance.

12) Preserving products/alternatives.

13) Printing on the planning products - maps, reports.

14) Transfer the planning products to external systems or Colleagues in standard formats (for example – ESRI GIS systems or the customer's data lake.

3.3.1.3 Service metrics module

A service metrics module will support in the management and definition of metrics and criteria for evaluating planning alternatives and the existing service activity.

The module's products will be available for use by the planners, who will use the planning module, and the Authority's managers, who will use the monitoring and measurement module.

See Appendix B' for examples of service metrics.

In the future, additional metrics and criteria will be developed that will enable an assessment of the efficiency and quality of the system and its data.

3.3.1.4 Control, Monitoring and measurement module

The module will support control, monitoring and measurement processes by users in the Authority, including:

1) Approving planning products.

2) Geographic and graphic display of service metrics for the service levels of public transportation services and the existing bus networks on a national, local, and line-level scale.

3) Recommendations for changes in the existing network, for example, route changes, adding stations, the possibility of limiting stations while paying attention to existing and new/planned stations, improving line schedules, adding or subtracting inputs on bus lines at the national, local and line levels.

4) Analyze and investigate the effect of applying changes in public transportation on public behavior.

3.3.1.5 Management module

The management module will provide authorized users, designated as administrators (for various topics) to perform activities such as:

1) Management of settings in the planning system - Defining rules / design rules, constraints and templates / models that will be used by the entire system.

2) Data import and management (see 3.3.2 – 3/3/4)

3) Data quality assurance

4) System management - backup and restore operations, manage users and permissions (see requirements in section 3.3.5.4).

3.3.2 Data layer

3.3.2.1 Complete, high-quality, up-to-date, and available data is the foundation for all processes.

3.3.2.2 The data layer will receive data required for the planning process: Alphanumeric information and geographic information.

3.3.2.3 The data, from a variety of data sources, will be received according to the frequency and availability of the update.

3.3.2.4 In the first phase, it is planned to attain data from the basic sources of information, as detailed in Appendix A, as well as data from transportation models.

3.3.2.5 Subsequently, the data will be absorbed from other sources, which may include data from applications used for transportation needs, new zoning plans, and data from cellular companies, etc.

3.3.2.6 The diagram shows a general distribution of 3 "types of data" at the level of:

- Geographic information - layers of geographic information, which will include *inter alia*, a layout of existing and planned infrastructures and construction, the transportation system, and more.

- **Planning support data** - the variety of data (non-geographical) that will be obtained from external sources or created by the administrators and forms a basis for planning, for example, transportation planning rules, public transportation supply, existing demand, movement count, design reviews, models, indices, and so forth.

- **Projects** - data that will be created by the planning project planners, including design alternatives or approved products. These could serve as a basis for further programs or future monitoring and measurement.

3.3.2.7 The information will be stored with complete privacy protection, as personal/private information is stored in the database.

3.3.2.8 Designing the databases and their physical distribution, including full characterization of each database, will be implemented by the supplier at the detailed characterization stage.

3.3.3 Data management layer

3.3.3.1 The data management layer will contain tools and mechanisms that will allow for the management of a qualitative and available data , and facilitate its utilization most efficiently and optimally.

3.3.3.2 The data management layer will contain the components displayed in the diagram:

Information Management & Processing	Business Intelligence BI	Data Catalog	Betterment	Reception

3.3.3.3 **Import** - the component responsible for receiving data to the data level. ETL tools and procedures for data load will be used, so that the data will form a basis for analyzing and processing of the BI tool.

Geographic data will be received in the standards acceptable in Israel in commonly used formats such as dxf, dwg.

Some of the import processes will be carried out by an administrator and some by the planner for the purpose of performing his work.

3.3.3.4 **Data Quality** - The component will support data quality and data filtering procedures that will be implemented in part automatically during the import phase, and others will be carried out at the initiative of the system administrator.

During the phase of data import from each of the sources, probability tests will be defined for the source data, and if necessary opposite the data already existing in the database. Exceptions will be treated automatically or labeled as exceptions for end-user treatment.

3.3.3.5 <u>Data Ccatalog</u> - the catalog will provide complete mapping of the data contained in the data layer, including the type of data (alphanumeric, geographic, photographic), the current level, and uses, etc.

The platform will enable catalog items to be designated with privileges for viewing, update or delete

3.3.3.6 <u>Business intelligence (machine learning),</u> BI, is a collection of tools that will support:

1) Implementation of nalysing and investigative procedures on the database.

2) Generation of reports and data processing combining the geographic dimension (area, community, and line, etc.)

3) Analytical capabilities such as statistic and forecasting tools, and improved forecasting and analytical capabilities utilizing guided and unguided learning processes

4) Graphically displays the results of the queries and reports, including controlling the graphic display of the report and presentation of data and indices on a GIS infrastructure.

5) Exports analysis results in standard formats such as Excel.

6) Construct complex queries, including calculations, filters, conditions, and operators.

7) Compares data and analyzes trends based upon the behavior of data on the timeline.

8) Evaluation of planning versus performance and betterment indices to assess the level of planning and its impact on users' behavior and satisfaction.

9) Identifies in real-time anomalies and locates patterns and factors affecting the level of service, based on learning algorithms, that enables an immediate response.

10) Analyzes a variety of data sources, including semantic analyses based upon data pooled in the Public Inquiry Call Center or other sources.

3.3.4 Interfaces layer

3.3.4.1 The interfaces layer is responsible for managing, scheduling, and controlling data transfer interfaces between the platform and associated systems in a secure manner utilizing connectors.

3.3.4.2 Data transfer/reception will be carried out in the accepted standards (REST, SOAP) and the accepted formats for alphanumeric data transfer such as XML, for example, and map transfer.

3.3.4.3 Online or batch interfaces will be run utilizing safes (or another alternative solution as will be determined), as defined for each interface.

3.3.5 Application infrastructure layer

3.3.5.1 The layer contains applications that will be used for building the platform's application modules and the information management layer.

Application Infrastructure	Users & Privileges	Process Management	GIS	System/Product Infrastructure for Planning

3.3.5.2 Planning infrastructure system/product

A dedicated public transport design core system, which provides built-in capabilities and tools, which support optimal planning of public transportation routes, including:

1) Setting planning goals and a project objective function (one or more), for example, shortening the travel time, increased efficiency, maximizing the number of passengers, travel time, and examining alternative plans with the objectives. Enabling a definition of a complex target function and determine the relative weight for each target.

2) Defining planning rules and constraints.

3) Facilitating data reception, including data mapping that supports planning processes.

4) Designing models/templates, their automated operation, and receiving recommendations/alternatives, including comparing alternatives, as a foundation for decision making.

5) Manual editing and testing of modules.

6) Sensitivity testing for input data.

7) Comparing the various planning alternatives and their examination vis-a-vis indices.

8) Carry out activities on a line, line network, and test the impact of the change - see requirements in the planning module herein.

9) Product production.

10) Product sharing, including the transfer of information for reception of the Authority's systems, for example, the ESRI product-based GIS system, and the data lake.

11) SDK enabling expansion and changes.

Additional specifications that will facilitate support in the infrastructure system are presented in the sections above and herein.

3.3.5.3 GIS Infrastructure

An infrastructure enabling reception, display, and analysis of multidimensional and multi-layered geographically based information including:

1) Manage and display of layers

2) Manage and display of entity characteristics

3) Calculating distances and areas

4) Labeling entities and data layers

5) Printing products

6) Export layers and products to external systems.

7) And so forth – please describe.

Comment: To the extent that the proposed solution is based on a GIS system, which is not an integral part of the core planning infrastructure product, the GIS system should meet the following requirements:

1) Is in the market for more than two years

2) Used in a broad customer base in Israel and abroad

3) To the extent the product is an open source - there is a meaningful, stable, and active community.

3.3.5.4 Managing users and privileges

This component will support platform access services, including:

1) Access management to the platform and to the modules.

2) User management and role management.

3) User/workgroup management.

4) Access authorization management to the data catalog at the update/addition/delete/approval/viewing level.

3.3.5.5 Process Manager

The process manager is an optional component that will facilitate construction of a workflow for planning processes, based on business rules, including:

1) Define the order of tasks - initiate, prepare alternatives, transfer for approval.

2) Define roles in the process.

3) Conditions and constraints for transfer between phases, according to the project's characteristics (for example, the project's geographic demarcation).

4) Manually channel tasks/projects for approval.

5) Manage tasks, reminders, and alerts.

6) Document the processes during run-time for monitoring and control needs.

3.3.6 <u>Display layer</u>

3.3.6.1 The layer responsible for presenting the platform's display components to users.

Display	UX / UI
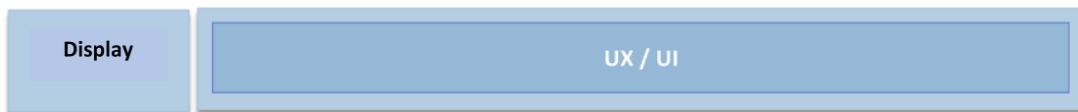
3.3.6.2 UX, UI design, planning, and performance will be executed while complying with advanced and accepted standards.

3.3.6.3 The user interface will be clear, accessible, and meet the following specifications:

1) System access will be based on a web interface through the use of common browsers.

2) Full Hebrew language support for the end-user, including reporting documents from right to left, text editing in Hebrew (not obligatory for the system's management tools).

3) A clear and accessible process flow.

4) Quick and easy navigation between screens.

5) Preserved uniformity in screen design, such as the location of toolbars.

6) Use of action buttons, only if their activity is meant to be possible.

7) Clear indications on mandatory fields according to accepted conventions.

8) Keyboard shortcuts for commonly used functions.

9) Warning before any "destructive" action. The system will request an additional approval from the user before any action from which there is no going back, such as a delete action, or an attempt to exit from a window that has been changed, without saving the data.

10) Help mechanism (including tooltips, onboard).

3.3.7 <u>Information security layer</u>

The platform will operate under an information security "envelope," that will find expression in all of the solution's components.

See specifications in Section 4 herein.

4 Technology and information security

4.1 General

The system will support installation in a fully virtual environment, including an application, database, and applicative infrastructures, etc.

The system will be developed in an open architecture that will enable flexibility and openness to changes.

The Supplier will be responsible for supplying all of the technological infrastructure required for the system's operation.

4.2 Hosting and storage

The infrastructures will be installed in a facility that will be designated during the characterization phase.

Storage and hosting services will meet the information security requirements attached as Appendix E' to the specifications.

The Supplier will be able to select among the hosting alternatives as listed below:

- Hosting in a designated host facility (hosting in the Supplier's compound, or at a designated expert supply facility.)
- Cloud hosting.

Hosting at a "server farm."

A computer facility in the Supplier's compound or at designated expert supply facility. The facility will comply with the following minimum specifications:

1) The alignment will contain at least 2 (two) computer rooms, located at a distance of at least 15 km from one another (in a direct line).

2) Each one of the facilities can provide all of the required services, without reliance upon the infrastructures installed at the second facility.

3) Every server farm hosts at least 200 physical servers.

4) The level of the electro-mechanical systems in the server farm will comply with Tier III standard requirements, according to the Uptime Institute settings.

Hosting in a public "cloud" environment

The cloud environment will comply with the specifications contained in the directive issued by the head of the ICT Authority concerning information security concerning a transitioning to a public cloud (Directive No. 6.12.5.1 Version 07 from 1/12/2015) and the direction of the head of the Government ICT Authority on the matter of the use of the public cloud (Directive No. 3.1 from 1/2/2016). In the link - https://www.gov.il/he/Departments/policies/public_cloud [HEB].

4.3 Availability

The system must have high availability. The overall level of system availability as an assembled functioning unit will be no less than 99% for a total system failure (a failure requiring the disabling of all the primary information systems in the project).

The availability level will be measure in regular activity days.

4.4   Performance

The required performances are:

Upload-time of each internal page, including information about the customer - up to four seconds.

The system must support the workloads of dozens of parallel users while prioritizing the various roles.

5 Realization requirements

Requirements related to project implementation/realization have been summarized in the section.

5.1 Demarcation and areas of responsibility

The table herein displays the primary tasks and division of responsibility between the entities involved in the project during the construction and maintenance phases.

Definitions pertaining to this section:

R - Responsible– the individual responsible for implementing the activity.

A –Level Accountable - the individual responsible for top tier product approval - the second approving entity.

A1 –Level 1 Accountable - the first approving entity.

C - Consult - contributes information, data, and insights to the activity.

I - Informed- informed concerning relevant decisions or products.

#	Tasks	The Company	The Regulator	The Supplier
1.	**Project management**			
.1.1	The Project Manager	A	I	R
.1.2	Risk management and the means for their prevention	A	I, C	R
.1.3	Organizational structure and role definition	A	I	R
.1.4	Manning roles in the project team	A1	A	R
2.	**Characterization phase**			
.2.1	Response to functional needs	I	A	R
.2.2	Defining detailed service metrics	I	R	I
.2.3	Detailed characterization	A1	A	R
.2.4	Data supply to the prototype	I	R	
.2.5	Preparation of a prototype for the system	A1	A	R
.2.6	Preparation of a planning document	A1	A	R
3.	**Licensing**			
.3.1	Core product licensing			R
.3.2	Basic sources of information licensing		R	
.3.3	Supplementary tools licensing			R
4.	**The Construction Phase**			

#	Tasks	The Company	The Regulator	The Supplier
4.1.	System development and application according to the approved design	A1	A	R
4.2.	UI/UX design	A1	A	R
4.3.	Establishment of a storage environment	A	I	R
4.4.	Data supply for the construction phase	I	R	
4.5.	Interface development for information reception from base sources	R	I	R
4.6.	Script preparation for acceptance testing	C	A	R
4.7.	E2E delivery testing	A	A	R
4.8.	Pen testing (security)	R	I	A
4.9.	User acceptance testing E2E (UAT)	A	I	R
4.10.	Training	I	A	R
4.11.	Assimilation	I	A	R
4.12.	Project completion approval	A	I	R
5.	**The Maintenance Phase**			
5.1.	License acquisition for system and maintenance services	A	I	R
5.2.	The data supply for the maintenance phase	I	R	
5.3.	Database management (information reception and betterment)	A1	A	R
5.4.	Information management and storage (including survivability and backup aspects)	A	I	R
5.5.	Data validation	A	I	R
5.6.	Support center	A	I	R
5.7.	Mapping and allocation of privileges to users	I	R	A
5.8.	Handling malfunctions	I	I	R
5.9.	Update the interfaces with the basic systems (each side is responsible for his part in the interface)	R	I	R

5.2 The team on behalf of the Supplier

5.2.1 General

5.2.1.1 To provide the specified services, the Supplier is required to operate a professional team that has knowledge and experience in implementing similar projects (hereinafter - "The Supplier's Team").

5.2.1.2 The Supplier bears full and exclusive responsibility that any time during the contracting period, professionals are assigned as necessary to perform the services of the required quality and comply with the times specified in the Agreement.

5.2.1.3 The Supplier undertakes that the team will comply with all information security specifications and requirements, as detailed in Appendix C' of these specifications.

5.2.1.4 For the avoidance of doubt, the Company in no ways demands the presentation of roles, as detailed herein, to exhaust all of the additional resources and personnel that may be required to fulfill performance of the services contained in this Tender, and that it is the sole responsibility of the Supplier to verify that he has available all of the necessary resources to comply with his obligations as per the terms of the Tender.

5.2.2 Professional Administrator

5.2.2.1 The supplier is required to appoint the professional administrator as presented by him in response to the Tender.

5.2.2.2 The professional administrator is answers to the Company on all matters related to the public transportation services planning during the period of the contract, including:

- **Managing the detailed characterization phase.**
- **Integrating the characterization requirements into the detailed planning documents.**
- **Managing the acceptance testing phase.**
- **Consult on matters relating to the system's operation.**

5.2.3 Transportation Planner

5.2.3.1 The supplier is required to appoint the transportation planner as presented by him in response to the Tender.

5.2.3.2 The transportation planner answers to the Company on all of the professional aspects related to the characterization of the planning services and processes that will be given by the system.

5.2.4 Architect

5.2.4.1 The supplier is required to appoint the architect as presented by him in response to the Tender.

5.2.4.2 The architect answers to the Company on all of the professional matters relating to the implementation of the services during the contract period, including:

- **All phases of the project's management.**

- **Consult on subjects relating to the system.**

- **The Supplier must include under the architect's employment agreement a commitment to employ for a minimum period of 24 months, starting from the date of signing the contract.**

5.2.5 Customer Manager

5.2.5.1 The Supplier will appoint a Customer Manager to represent all of the Supplier's activities vis-a-vis the Company.

5.2.5.2 Customer Manager services will include:

- **Management of all the Supplier's services.**

- **Representing the Supplier vis-a-vis the Company.**

- **Hiring and changes in the Supplier's team.**

5.2.6 Additional personnel

5.2.6.1 The Supplier will be obligated to provide additional professionals whenever required to perform the services.

5.2.6.2 It should be clarified that the Company is in no way obligated to contract for services of any scope whatsoever, and this is solely an availability requirement on the part of the Supplier's team.

5.2.6.3 The Company may present additional requirements for the approval of professional personnel (including the matter of specific training, certification, or experience).

5.2.7 Replacing an entity on the Supplier's team

5.2.7.1 The Company is entitled to demand that the Supplier replace any one of the members of the Supplier's team at any time and for any reasonable reason. The Supplier will appoint a new team member within 30 workdays.

5.2.7.2 The Supplier is not entitled to replace a member of the team without the written, *a priori* agreement of the Company and the Company will not avoid giving its said agreement except for reasonable cause.

5.2.7.3 In the event a representative of the Supplier's team decides to terminate his employment with the Supplier, the Supplier will notify the Company immediately upon becoming aware of the matter. The Supplier will require from each representative on his behalf a 30-day advance notice period during which he/she will be required to continue to provide services under this Tender.

5.2.7.4 The Supplier will oversee the best, comprehensive, and satisfactory overlapping with the new team member, on a scale and level acceptable to both parties, and not less than five working days. All of the costs incurred as a result of the replacement of the Supplier's team representative (including the work hours of the replacement in the overlapping period) will be borne by the Supplier.

5.2.7.5 The Supplier undertakes that the replacement of the Supplier's team for any reason does not violate his obligations under this Tender and that the replacement representative is of a high standard and meets the threshold conditions defined in the Tender for the relevant position.

5.2.7.6 A replacement transportation planner or architect will be approved after a replacement is appointed.

5.2.7.7 The replacement transportation planner has qualifications that do not fall from the previous planner, according to the discretion of the Company representative. For this section, non-falling qualifications will be considered - skills and talent that would afford the replacement team member a quality score (according to the standards in Section 4.3 of the Tender) that is no less than the quality scoring given the original, presented transportation planner. Should the replacement transportation planner not comply with the mentioned in this section above - the Supplier will pay an agreed compensation in the amount of NIS 30,000 to the Company.

5.2.8 Subcontractors

5.2.8.1 The Supplier may indeed employ subcontractors, subject to attaining advanced, written approval from the Company. If such a subcontractor is required to operate, the Supplier will provide a reasoned request specifying the need and the period of employment requested.

5.3 Characterization phase

5.3.1 The characterization phase will contain all of the following secondary phases (as subsequently detailed for each phase):

Characterization phase	Basic documents for the performance of the phase	Maximum schedule for the conclusion of the phase (in days)	Phase termination review	Phase termination product
Kick-off meeting	Tender documents, a methodology document submitted by the	ARO + 10	---	Work plan document

	Supplier in response to the Tender			
Detailed characterization for a prototype	The work plan document	ARO + 40	SRR	Approved characterization for a prototype
Preliminary planning (HLD)	The approved characterization document	ARO + 80	PDR	Preliminary planning
Detailed design (LLD) for the prototype	Preliminary design document	ARO + 100	CDR	Approved characterization
Building a prototype	A detailed design document approved for the prototype	ARO + 120	----	A prototype, according to the specifications detailed in Section 5.3.9 herein

ARO = the decision concerning the winning Supplier

5.3.2   A conceptual schedule for executing design reviews (in workdays)

Phase	Workdays RD=Review Date
Deadline for submitting documents to the design review	RD-14
Company approval for conducting the design review	RD-7
Date of the design review	RD
Submission of modified documents following the design review	RD+7
Repeat testing of the documents by the Competent Authority, and issuance of final approval	RD+14

5.3.3   Emphases concerning the schedule

5.3.3.1   The detailed schedule will be determined as part of the characterization phase

5.3.3.2   The Supplier is entitled to execute the project within a shorter schedule.

5.3.3.3   During the characterization phase, the Company is required to provide answers to the Company within four working days from the date of receiving the query for professional clarifications/completions. Answers are given after the four working days (in the event thereof) will afford the Supplier the right to submit a request for a schedule extension for the particular milestone, according to the scope of the days by which the answer was delayed. The Company will discuss the request and notify the Supplier of its decision. It should be emphasized that the Supplier will not demand and will not be entitled to any additional remedy and/or compensation because of a delay in the schedule to complete the milestones, except as stated in this section.

5.3.4   <u>General Instructions for the Characterization Phase</u>

5.3.4.1   During the characterization phase, weekly status discussions will be held in the Company's offices, designed to verify the progress of the planning process. The Supplier will be required for every status discussion to present his progress.

5.3.4.2   The Supplier will provide the Company with draft versions of the planning documents during the planning period as required. The Company may comment on the document drafts, and the Supplier will be required to make corrections accordingly. It should be clarified that it is indeed possible that this process will be repeated several times if so required.

5.3.4.3   During the characterization phase, the Company will provide answers to the Company within five working days from the date of receiving the query for professional clarifications/completions. Answers given after the five working days (in the event thereof) will afford the Supplier the right to submit a request for a schedule extension for the particular milestone, according to the number of days by which the answer was delayed. The Company will discuss the request and notify the Supplier of its decision. It should be emphasized that the Supplier will not be entitled to any additional remedy and/or compensation because of a delay in the schedule to complete the milestones, except as stated in this section.

5.3.4.4   During planning, design reviews will be conducted. The content of the design reviews is detailed herein. **The following subjects will also be presented in each design review:**

- **Mapping a list of the open subjects and tasks still requiring a decision.**
- **Present the demands imposing constraints on the project's advancement.**
- **An updated risk management table.**
- **Subjects for the coming design review.**

5.3.4.5 Upon conclusion of each phase during the planning phase and after corrections made concerning all of the Company's comments, the Supplier will submit a final draft of the relevant document for approval. Following the Company's approval, the document will be designated as final and serve as the basis for continuing the characterization phase. The transition of each phase of the planning phase requires Company approval concerning the completion of the previous phase.

5.3.4.6 The Supplier must manage the changes in the planning documents and maintain an updated version at all times.

5.3.4.7 Upon conclusion of the characterization phase, the Supplier will submit all of the final planning documents to the Company for approval. After issuing its approval, the Company will define the documents as "**Approved Design**." Receiving this approval and certification from the Company constitutes a condition for the Supplier's transition to the construction phase.

5.3.4.8 Should the Supplier fail to comply with the requirements of the characterization phase - the Company will be entitled to the compensation as agreed and detailed **in Appendix D'**.

5.3.5 <u>Kick-off Meeting</u>

In the initial phase, and on a date set in schedule detailed above, a kick-off meeting will be conducted. As part of the meeting, the following subjects will be presented:

5.3.5.1 Presentation of the characterization phase management plan (PMP).

5.3.5.2 Presentation of the organizational structure and roles on behalf of the Supplier for the performance of the project.

5.3.5.3 Presentation of a preliminary schedule for the characterization phase.

5.3.5.4 A document detailing how the specifications of the Tender are understood by the Supplier. A document will be submitted on a VCRM table (Verification Cross-reference Matrix) that will contain all the specifications of the Tender.

5.3.5.5 Risk management methodology and a preliminary risk report.

5.3.5.6   Technological management tool for monitoring project progress (monitoring decisions, documenting, and managing documents).

5.3.5.7   Change management procedure.

5.3.6   <u>Preparation of a detailed characteristics document</u>

5.3.6.1   The Supplier will prepare a detailed characteristics document that will be based upon the following sources of information:

- **Characterization of the technological and functional requirements as prepared by the Company, and presented in Sections 3 and 4 above.**

- **A methodological document that was presented by the Supplier as part of the response to the Tender.**

- **All of the Agreement's provisions.**

5.3.6.2   As part of the characterization document, the Supplier will include, *among other things*, a reference to the following subjects:

1) An examination of the basic sources of information - the Supplier will be required to perform a detailed mapping of the basic sources of information beyond the information detailed in **Appendix A'** - Information Concerning Basic Sources. The mapping will include a characterization of basic information bases, mapping the types of information contained in the existing information bases, the probability level of the data, information shortages, information update timing, limitations of use (such as privacy aspects), the ability to export the information.

2) A detailed definition of service metrics - the Supplier is required to conduct a detailed definition of the service metrics according to examples detailed by the Company in **Appendix B'** of these specifications. Also, the Supplier will be required to submit at least **eight additional metrics** that will enable the evaluation and comparison of planning solutions and alternatives as well as the effect of applied changes on the public transportation network, of which at least three of the metrics are from the field of economics.

3) <u>Mapping user requirements -</u> the Supplier is required to interview at least six leading users to understand the existing planning procedures for public transportation planning in Israel.

4) Defining the required planning process based on the system's information - the Supplier will be required to submit a proposal for executing a system-based planning process (flow). The document will include a reference to updating the public transportation procedure detailed in Appendix ___.

5) Define a process for conducting optimization between alternatives.

6) Define the simulations and reports that will be produced as part of the system - the Supplier will be required to submit a detailed document on the subject, based on simulation examples detailed in **Appendix 4** of these specifications.

5.3.6.3 After the detailed characterization phase, a **System Requirement Review- SRR** will be conducted in which the characterization document will be presented.

5.3.7 Preliminary characterization phase (HLD)

A preliminary characterization phase will be conducted following the conclusion of the detailed characterization phase. After this phase, a PDR-Preliminary Design Review will be conducted. In this review, the following subjects will be presented:

5.3.7.1 The system's response to the approved characterization specifications - refer to each one of the subjects contained in the approved characterization and explain the response given to the in the system.

5.3.7.2 System architecture

5.3.7.3 Software Requirements Specification (SRS) - a detailed document of all system software components (the proposed software and transversal tools), and all software changes meant to be developed.

5.3.7.4 A detailed schedule utilizing the Gantt method, including contingencies and constraints in external and internal entities.

5.3.7.5 A work plan for conducting the system setup phase - the plan will include (*inter alia*):

- **Schedules, milestones, technological tools presentation, the Supplier's team, and detailing of required means.**

- **Interfaces, including a presentation of the interface, means, and flow of information from the base systems to the system.**

- **Acceptance testing methodology**

- **A presentation of a response to information security specifications.**

- **A presentation of management system capabilities**

- **Defining specifications for a development environment and a testing environment**

- **Detailing system performances, including a presentation of the response to availability requirements for the entire system.**

- **QA/QC procedures**

- **Operation and maintenance alignment principles**

5.3.8 Detailed characterization phase (LLD) for the prototype

The detailed characterization phase will be implemented after the conclusion of preliminary design, during which a detailed design of a prototype will be executed, including:

5.3.8.1 The architecture of the components required for the prototype.

5.3.8.2 Presentation of the information flow processes from sources of information.

5.3.8.3 Flow diagrams of all the activities in the system designed for the prototype.

5.3.8.4 Primary system screen design (GUI).

5.3.8.5 Required information sources/files, including basic betterment procedures.

5.3.9 Prototype preparation phase

5.3.9.1 The supply will construct a system prototype. The prototype will contain all of the modules to be integrated into the system according to the approved design documents.

5.3.9.2 The construction will contain an environment, which includes a design process for an urban skeleton network of the city of Beersheva, as per the phases detailed in Section 3.2.2.2 and line/station planning and Section 3.2.2.3 for line/station.

5.3.9.3 The Supplier will present a comparison between the "business as usual" alternative and at least one planning alternative, included, including service metrics testing, optimal performance, and user number forecasting. The system will enable the analysis and investigation of the effects of changes on the behavior of the forecasted public.

5.3.9.4 The system will provide tools for analysis and investigation of the effects that the changes have on the behavior of the public.

5.3.9.5 The effects of the changes will serve the system in its optimization of the future design quality, calibration of forecasting capabilities, and indices for assessing design products.

5.3.9.6 In the environment to be determined, it will be possible to use up to 4 office users, and this for a period no less than six weeks.

5.3.9.7 After the users work on the prototype, a process of learning will be carried out. As it becomes clear during prototype preparation that the system fails to meet Tender requirements, the Supplier will have to demonstrate how the gaps revealed in the system will be completed.

5.3.9.8 Prototype completion and repair of all the conclusions will constitute a condition for completing the characterization phase and transition to the construction phase.

5.4 <u>Final Report</u>

5.4.1 Upon completion of the basic services, the service provider will be required to prepare a final summary report.

5.4.2 The final report will include:

5.4.2.1 All approved design documents (and their updates).

5.4.2.2 The prototype, including all the detailed code, privileges, and documentation of its construction.

5.4.2.3 A list of the risks for the detailed characterization phase and the development phase.

6 <u>Services for the Second Phase - the Optional Services</u>

6.1 **Detailed characterization phase (LLD)**

6.1.1 <u>A detailed characterization phase will be conducted following the conclusion of the preliminary design. After this phase, a CDR-Critical Design Review will be performed.</u>

6.1.2 <u>The review will contain a reference to the following subjects:</u>

6.1.2.1 The detailed architecture of all the system's components.

6.1.2.2 A detailed Bill of Materials (BOM) of all the systems components.

6.1.2.3 A presentation of flow diagrams of all the activities in the system in a manner supporting the design processes formulated in the detailed characterization phase.

6.1.2.4 Defining the system portal.

6.1.2.5 System design (GUI).

6.1.2.6 Settings for an information security tool.

6.1.2.7 A presentation of the detailed design of the required infrastructures.

6.1.2.8 A detailing of the system's databases.

6.1.2.9 The system's response to stress load specifications.

6.1.2.10 A presentation of management system actions.

6.1.2.11 A detailing of the testing environment and the test.

6.1.2.12 A full-scale installation plan including coordinations with third-party entities.

6.1.2.13 Acceptance testing scenarios **STD - System Test Description** as well as a presentation of the test management process.

6.1.2.14 The Supplier's estimates for providing Operations and Maintenance Services, including an estimate for MTTR (Mean Time To Repair) and MTBF (Mean Time Between Failure).

6.1.2.15 Backup and restoration procedures (RPO/RTO).

6.1.2.16 Quality management plan - the quality plan will comply with the specifications of SII ISO 9001-2015, during the entire life cycle of the system.

6.1.2.17 System documentation plan.

6.1.2.18 Assimilation plan.

6.2 Licensing

The Supplier will supply to the Company every license required for the platform's construction and operation, in a manner that will address in the first phase up to 100 users, with a possibility for additional expansion, as per the Client's needs.

6.2.1 The licensing will include a response to each of the detailed herein:

6.2.1.1 Licensing for all the components in their most updated versions.

6.2.1.2 The properties that will be proposed by the Supplier will be detailed in Appendix XX as part of the response manual, including properties that the Supplier undertakes their completion and are under development, and this as per the schedules to which he has committed as part of the response.

6.2.1.3 The licensing will contain a response to the system's installation in all of the required environments - the production environment (Prod), the development environment, and the testing environment (Test).

6.2.2 The Supplier undertakes that:

6.2.2.1 The presented manufacturer is the exclusive owner of the IP in the core product.

6.2.2.2 Will supply all the services and rights contained in the licensing of the core product.

6.2.2.3 Will supply alone or through subcontractors all the rights contained in the license (including in supplementary tools), including maintenance services, and this as per the licensing terms of these tools.

6.2.2.4 If licensing is discontinued for the system and/or for supplementary tools included in the Supplier methodology document, the Supplier undertakes to provide alternative tools, the features of which do not fall from the features included in the transversal tools specified in the proposed configuration.

6.3 Construction and preparation for operations

6.3.1 The Supplier will construct the system according to the approved design.

6.3.2 The construction will include the following phases:

  6.3.2.1 Installation of all the system's components.

  6.3.2.2 Construction of the information storage environment.

  6.3.2.3 Building the interfaces for the basic information sources.

  6.3.2.4 Construction and operation of information security tools.

  6.3.2.5 Construction of the development, testing, and DR environment.

6.3.3 The Company is entitled to demand updates in design documents, as required during the development period.

6.4 Acceptance testing SAT

6.4.1 The supplier is responsible for performing all the tests necessary to prove that the system complies with the approved design specifications and the remaining specifications and conditions and specifications set for in the Agreement documents.

6.4.2 Testing documents will be drawn as per the IEEE 829 standard.

6.4.3 The Supplier will provide all that is required to perform testing, including - a testing environment, testing personnel, etc.

6.4.4 The schedule for performing acceptance testing will be detailed in the approved design document.

6.4.5 The Company will be able to determine the conditions for implementing acceptance testing as part of the approved design document as well as demand that a representative on its behalf is present during testing.

6.4.6 Upon completion of each test, the Supplier will provide a full final report relating to the achieved results.

6.4.7 The Company is entitled to demand repeat testing of components under testing, in any case in which testing results are not attained.

6.4.8 The Supplier must consider the testing process in the framework of the project's design schedule.

6.4.9 Approval of the relevant acceptance tests constitutes a condition for receiving completion certification for the system. No delay in this process as a consequence of the non-approval of acceptance tests in light of defects and comments will serve as a source for demanding any remedy whatsoever on the part of the Supplier.

6.5 Training and embedding

6.5.1 The Supplier will train all the entities on behalf of the Company in the use of the system as well as training in subjects on maintenance.

6.5.2 The Supplier will provide training for 15 individuals for a period of 3 working days. The training will take place at the Company's offices.

6.5.3   The Supplier is required to prepare a training program. The training program will contain *inter alia*:

    6.5.3.1   A list of the training programs that will be conducted (syllabus).

    6.5.3.2   A team of instructors provided by the Supplier.

    6.5.3.3   A training schedule.

    6.5.3.4   The certifications required at the conclusion of the tests.

    6.5.3.5   Refresher program.

    6.5.3.6   Support logistics.

6.6   Documentation

6.6.1   It is the Supplier's responsibility to supply full documentation of the system. The documentation will contain *inter alia*:

    6.6.1.1   An instruction manual for installation and use.

    6.6.1.2   All approved design documents (and their updates).

    6.6.1.3   Training literature

    6.6.1.4   Final acceptance test reports

    6.6.1.5   Quality management plan and regularly scheduled reports.

6.6.2   The Supplier bears the responsibility to receive Company approval for the documentation content of the system. System training and documentation will be in English; the adjustments required by the office will be in Hebrew.

6.6.3   The documentation will be submitted on digital media that will be certified by the Company.

6.7   Completion Approval

6.7.1   With the completion of the construction phase as detailed above, the Supplier will submit a request for completion approval.

6.7.2   The Company will examine the request to verify that the Supplier complies with all the Agreement's specifications. If necessary, the Company can demand further completions and clarifications.

6.7.3   Upon completion of the corrections emanating from the comments and execution of the completions as mentioned above, the Company will issue the Supplier the requested completion approval. This approval constitutes a condition for the final payment of the consideration for construction.

6.8   The Maintenance Phase

6.8.1   The Supplier will be required to provide full-scale system maintenance for the entire period of the contract, according to the instructions and provisions contained in the Agreement.

6.8.2   The Supplier's maintenance services will include all of the detailed below:

6.8.2.1   Preparation of an annual maintenance plan.

6.8.2.2   Regular software updates - the Supplier will perform a software update within 30 working days from the date of publication of the relevant software component update by the manufacturer. The date of the update will be coordinated in advance with the Company.

6.8.2.3   Regular update of the sources of information (the basic and additional - to the extent thereof).

6.8.2.4   Plan and execute an annual exercise (dry and live simulation) to test the system's compliance with the business continuity requirements, including a transition to the system's operation from the DR site.

6.8.2.5   Execute regularly scheduled system backup in a manner that complies with the RTO=12 hours' specification.

6.8.2.6   Perform a quality review as per the quality program detailed in the approved design.

6.8.2.7   Activated and operate a help desk and service call center, as detailed herein.

6.8.2.8   Repair any glitches or malfunctions in the system, according to the detailed herein.

6.8.2.9   Conduct ongoing documentation of system maintenance activity.

6.8.3   General maintenance services guidelines

6.8.3.1   The scope of the system's shutdown hours will not be greater than 20 hours per annum.

6.8.3.2   The Supplier must plan a maintenance plan while minimally affecting system operations.

6.8.3.3   The Supplier will ensure that maintenance operations are performed according to the licensing instructions for the base system of transverse tools integrated into the system in such a way as to not lead to their infringement.

6.8.3.4   The Supplier will supply maintenance service in such a manner as to facilitate full compliance with all service levels.

6.8.3.5   The Supplier will operate according to the Quality Management Plan.

6.8.3.6   Maintenance services will be supplied according to the information security guidelines contained in Appendix E' of the specifications.

6.8.3.7   Follow-up discussions - On an as-needed basis, the Company will invite Supplier representatives for follow-up meetings on various topics, such as how required services are provided by the Supplier's team, the Supplier's compliance with service levels, malfunctions, updates, and efficiency proposals, etc.

6.8.4 Annual maintenance plan

The Supplier is responsible for preparing an annual maintenance plan that will include:

6.8.4.1 Formulating an MP-Maintenance Policy.

6.8.4.2 Complying with the availability level required from the system.

6.8.4.3 Defining a maintenance team on behalf of the Supplier (including the required subcontractors).

6.8.4.4 Performance times and frequency for the execution of preventive maintenance.

6.8.4.5 A simulation exercise plan for testing compliance with business continuity specifications.

6.8.4.6 A plan for scheduled software updates throughout the year.

6.8.5 Support services and service call center

6.8.5.1 The Supplier will be required to provide Hebrew language support services (help desk).

6.8.5.2 Support services will be provided on any topic related to running the software, including on transverse tools integrated into the proposed configuration.

6.8.5.3 Support services will contain *inter alia*:

1) Assistance in installations and settings.

2) Assistance during version upgrades.

3) Assistance with problems and malfunctions.

4) Regularly scheduled training for Company representatives.

5) If necessary, an escalation will be performed, by referring queries to the manufacturer's support centers around the world, including international experts, if needed.

6) Any referrals to support services will be performed by telephone, website, or email.

7) The referrals will include a possibility for secure remote access, according to the accepted standards in government ministries and financial entities.

6.8.5.4 The service level of the support services.

1) The support services will be supplied during the following hours of operation - Sunday - Thursday between the hours of 8:00-17:00 (hereinafter - "**Regular Operating Hours**"). Beyond the regular

operating hours, a message center will be established, which will allow messages to be delivered on critical glitches.

2) Upon receiving a query, the applicant will receive automatic feedback that his query has been received and will also receive a query ID number.

3) Response time for answering by a professional on behalf of the Supplier (who is technically capable of dealing with complex malfunctions) will not exceed 30 minutes from receipt of the query at the call center.

4) Response time for answering by a manufacturer's professional - up to 24 hours from the time the query has been referred from the Supplier's help desk, and no later than 48 hours from the time of the query.

5) If the required response time exceeds regular business hours, a response will be given at the beginning of the next business day in such a way that the cumulative response time (on the day of the query and the next business day) does not exceed the maximum duration defined above.

6.8.5.5 The Supplier will manage all the calls referred to the help desk (including documentation of the essence of the query, handling status, handling scheduling, and the given response). At the end of each month, the Company will issue a query report, including the applicants' details. The report's content will be defined by the Company as part of the characterization phase.

6.8.6 Handling malfunctions

6.8.6.1 The Supplier undertakes to repair malfunctions according to the levels as stated herein:

Severity level	Type of malfunction	Maximum handling start time
1	**Critical malfunction - any malfunction causing a total system shutdown.**	**Up to two hours during regular work hours.**
2	**Urgent malfunction - any malfunction causing significant harm to the system's operations.**	**Up to four (4) hours for malfunctions discovered during regular work hours (8-17) or 3 hours during the subsequent workday, for malfunctions discovered beyond regular work hours.**

Severity level	Type of malfunction	Maximum handling start time
3	**Regular malfunction - a malfunction that is not critical nor urgent.**	**Until the conclusion of the workday following the day of the malfunction report.**

6.8.6.2 The Supplier must work continuously until the complete repair of the malfunction.

6.8.6.3 The Supplier will convey monthly software glitch reports to the Company.

6.9 Separation Process

6.9.1 The Supplier undertakes to continue full-scale service according to Agreement specifications, without affecting the service level to which he is committed, throughout the period that is between the date an alternate Supplier is selected until termination of the contract as per the Agreement (for any reason whatsoever) (hereinafter - "Separation Period").

6.9.2 The Company will notify the Supplier 60 days in advance concerning the start of the separation period. In the absence of the notification mentioned above, the last 60 days in the contract period, according to the Agreement, will constitute the separation period.

6.9.3 During the separation period, the Supplier will employ a dedicated professional who will coordinate all the additional activities required from the Supplier during the separation period.

6.9.4 As part of the separation process, the Supplier will perform the following activities (beyond the ongoing services as per the Agreement's provisions):

6.9.4.1 A plan for separation will be prepared by the Supplier within seven days from the start of the separation period. The separation plan will be submitted for Company approval.

6.9.4.2 Prepare a series of overlap meetings with the alternate Supplier. The series will contain at least two, 3-hour session meetings.

6.9.4.3 Prepare a five workday training program. The training program will contain the details of the software capabilities, the maintenance process, open subjects, and betterment projects.

6.9.4.4 Preparation of a documentation file comprised of all the documentation required according to the Tender, and updated until the start of the separation period. The details will include the types of licenses, complete agreements, and a listing of subcontractor contact personnel.

6.9.4.5 The maintenance plan for the following year (including planned maintenance dates and technology update stations).

6.9.4.6   Deletion of all the information related to the contract from the Supplier's databases.

6.9.4.7   Transfer of all documentation concerning Operations and Maintenance Services.

Appendices

Appendix A' - Basic Sources of Information

The appendix displays the basic sources of information, designed for reception in the first phase of the project:

License data system (GTFS)	Files containing all the licensing data, including a list of public transport operators in Israel.	The information is available for download through the National Public Transport Authority website - see link.	
Passenger count systems	Information at the line, and station level, including: No. of embarking passengers, No. of disembarking passengers, No. of bus passengers.		• Problems concerning the quality of the data and its integrity. • Relatively low scope of system deployment. • Problems with division into hours or directions.
Real-time data (SIRI)	Real-time information concerning buses and trains in public transportation including ETA of a vehicle to a station, its present location, on the condition that the vehicle began its trip	For details see: **Link**	(*) In this phase, information is not being provided concerning the Jerusalem LRT, East Jerusalem operators, and Hevel Eilot. In Israel Railways location is not transmitted. Challenges: Is not installed in all of the buses Communications difficulties.
Clearinghouse	Data of 700 million passengers (trip, operator, number of passengers,		Serves for economic needs, while at the same time is instructional

	payment location, profile, and contract type, etc.)		concerning passenger activity. Challenges in the data: - The data can be relied on as minimum data since the back door boarding and subsequent non-payment costs are not considered. - Problems with division into hours or directions. - Problems with data integrity and attribution at the trip and line level.
Passengers	trip, operator, number of passengers, payment location, profile, and contract type, etc.).		
Performance monitoring (VM) -	The system collects GPS data from buses operating in 17 bus operators divided among 65 clusters.		Planned to replace SIRI A challenge of integrity and quality
Public query referral system	Information on public query referrals concerning public transport lines. Receives approximately 45,000 addressed referrals in a single year		Open queries, lack of information focus.
Enforcement and control			
Report systems	Monitoring operator performance.		
Travel speeds on Israeli roads and traffic counting systems.			
Survey data	Satisfaction surveys are conducted as part of operational control	The information is received in commonly	A lack of uniformity between surveys

		accepted XLSX and CSV formats	conducted in different areas.
	• Travel habit surveys • Passenger count services and origin-destination matrix • Specific pinpoint surveys		• The obsolescence of the information gathered in light of the wide-ranging changes in the network.
Information systems of additional transportation entities (e.g., Israel Railways, light rails).			
Tax data	The population at the community settlement level Municipalities report - business property tax and residential property tax areas		• On a national scope, no information exists at the neighborhood or employment site level.
Geographic information regarding the deployment of urban construction and the existing and planned transportation infrastructure in Israel.	• Planned and existing urban zoning plans. • Transport development plans, including roads, mass-transit systems, railroad, and bicycle trails, etc.	Most of the information presented is available on the "Hatzav" system website of the Ministry of Transport and Road Safety.	
Transportation model data	Employing affiliated agencies, the Ministry of Transport administers transportation models for forecasting at the national and metropolitan levels based on ongoing information gathering concerning diversity in destination		• Low sensitivity to changes in the bus line system. • Lengthy processing duration

	changes. These assist in forecasting traffic on varying scales and support the planning process.		
Big data reservoirs	Based on application data and data based on cellular sources received from various providers, the Ministry of Transport produces a database on traffic to/from employment sites. The information shows the traffic at a level of statistical areas and subdivided into different parameters such as day periods, means of transport, and length of stay in the complex. Additionally, use is made of big data from cellular sources to identify passenger traffic as part of an updating of the national model for travel trip demand. This work provides an estimate of the national travel at a level of 2,630 traffic areas based on an examination of stay at a primary residence and place of work.		• Invalid information, with representational and completion issues. • A high cost for gathering in meaningful volumes. • A lack of experience of companies engaged in the public transport industry. • There is specific information concerning various areas in Israel. • Use of various methodologies for implementing information gathering.

Appendix B' - Service Metrics

Background

The Public Transport Authority is preparing to formulate a strategy for the development of a bus network in Israel. As a phase preliminary to the plan, the Authority has formulated a set of principles concerning public transportation in Israel (as detailed in Section 3.2.3) and created service levels necessary to examine the quality of the existing service, the planned service, and assess alternatives.

It is to be emphasized that this document is at the first draft level, including examples of common service metrics. The list of the metrics detailed in the document is neither final or closed. There are many additional service metrics required for development and application, both in the central framework and in parallel to improving internal and external database collection and analysis capabilities.

Literature Review

Based on the service metrics creation process stood a review of the existing literature on the subject in Israel and across the globe. The literature review included the following sources:

Author	Source
Ministry of Transport	Guidelines for the Design and Operation of a Public Bus Transport Service (2016)
Ayalon Highways	Criteria for Public Transport Planning
The Knesset, Center for Information and Research.	Issues in Measuring the Level of Service in Public Transport
WBCSD	Methodology and indication calculation method for sustainable urban mobility 2020
UMP Vienna 2025	Step 2025 - UMP Vienna
	Urban Mobility Plan Vienna 2025
EMTA	EMTA Barometer 2019
Merchav - the Movement for Urbanization in Israel	Transport Analysis for Israel

Service Metrics

Category 1: Availability for public transportation

a. **The length of the public transportation and mass transit system relative to the length of the country's roads**

b. **The number of stations with at least four stops in an hour per 10,000 residents.**

c. **Licensed kilometer relative to 10,000 residents.**

d. **The percentage of the population within walking distance of up to 500 meters from a regular stop with at least four stops in an hour.**

e. **The percentage of the population within walking distance of up to 400 meters from a skeleton artery/fast line station.**

f. **Public transport intensity.**

g. **The number of transfers between means.**

h. **Line density level.**

Category 2: Accessibility to service destinations

a. **Travel distance within a time frame.**

Category 3: Operations and functionality at the system and line level

a. **Commercial speed according to means of public transport.**

b. **Satisfaction**

c. **Number of passengers embarking on traveling a line**

d. **The number of passengers embarking per traveled kilometer.**

e. **Kilometer lines to preferred routes ratio**

Category 4: Economics

a. **NIS per customer**

b. **Line efficiency - NIS per customer**

Category 6: Demand

a. Demand for public transport per 10,000 passengers

b. **The number of embarking public transport passengers per year relative to 1,000 residents.**

c. **Average embarking passengers for travel per means.**

d. **Average kilometer for travel per public transport means.**

e. **Travel splits between means**

Category 6: Satisfaction

a. **The Public Transport Authority is currently working to embed an overall concept for analyzing and processing satisfaction questionnaires aimed at obtaining data in short time frames and at a trip/line level of detail. Satisfaction testing is based largely on feedback that will be sent to travelers using the Travel Validation app and is therefore expected to generate a large number of respondents in a short period. This capability will be used to provide**

ongoing feedback concerning the level of service as well as identify and examine issues faced by the Authority.

Appendix C' - Information Security

1. Objective

   1.1 It is this appendix' objective to define and set the instructions and guidelines that will obligate the Supplier and all those employed on his behalf in the provision of services, as part of the actions, all of which are taken to protect information belonging to the Transport Ministry and its information systems.

   1.2 All the specifications in the document are directed to the Supplier, but also apply to those involved in providing services on his behalf unless expressly recorded otherwise.

2. Definitions

   2.1 Security representative - a ministry/Company representative to the matter of information security.

   2.2 The Supplier - including his employees, representatives, core product manufacturer, subcontractors, and service providers on his behalf.

3. Information security trustee

   3.1 The Supplier will appoint an Information Security & Cyber Defense Trustee - a member of the Supplier's Information Security staff and suitably trained to be responsible for the information and cyber defense included in the Client's data banks, which are stored in the Supplier's systems and servers as required by the Privacy Protection Law 5741 - 1981 and information security regulations.

   3.2 The Information Security Trustee will serve as the contact person between the Supplier and the ministry's security personnel.

4. The Supplier's team reliability

   4.1 Every Supplier's team representative who will participate in the project will undergo reliability testing conducted by the security representative, and this test constitutes a condition for initiating the work activity of each representative. The specifications will be valid for subcontractors, temporary employees, and any other service provider contracted on the Supplier's behalf.

   4.2 The Supplier undertakes that:

   4.2.1 He will employ in all works related to the Tender's execution, only those employees approved for hire by the security representative.

   4.2.2 Will not hire in the provision of required services any employees on his behalf, who have yet to be certified, and will not expose them to any material related to the execution of the Agreement before receiving the stated approval.

   4.2.3 Will not expose them to any material related to the implementation of this Agreement before they complete the employee reliability process and permitted by the security representative to supply services to the ministry.

   4.2.4 Any entity lacking authorization will not be permitted access to the sites where he is working.

   4.3 The information security trustee appointed on behalf of the Supplier is responsible for verifying that the forms have been completed for all those employees, including subcontractors, participating in the project on his behalf, transmit them to the security

representative and monitor the approval and certification of the representatives approved for work.

4.4 The information security trustee will provide regular updates to the security representative concerning any changes in the employees engaged in the project.

4.5 The Supplier undertakes to update the security representative immediately concerning any employee, who is providing services to the Client, who terminates his work in the company upon reception of the notification of termination and the pertinent reason thereof.

4.6 The security representative retains the right to reject any of the employees with the need to provide a reason or explanation whatsoever, and his decision will be final and decisive.

4.7 The Supplier undertakes to meet the schedule for implementing his portion in the project, without dependency upon the security certification for certain employees, or removal of other employees, before or during the work, and on the condition that the approval/refusal will be issued by the security representative within ten working days, from the date of reception of the relevant documents from the Supplier.

5. Confidentiality

5.1 The Supplier with this declares he is aware that the information received during the provision of the Services to him or those on behalf is of special sensitivity, and undertakes that he or anyone on his behalf will not pass this information on to any other party with whom he is not connected to provide the Services unless given advance approval by the security representative and under conditions as may be prescribed by him.

5.2 The Supplier declares familiarity with the provisions of the Privacy Protection Law, 5741-1981, and the regulations that it has enacted, and that he will act as required by this law and any other legislation relating to the safeguarding and confidentiality of the information in his possession.

5.3 The security representative may provide additional guidelines on the confidentiality and security of information during the period of the contract, either in writing or verbally, which will obligate the Supplier without the ability to appeal.

5.4 If at any time the Supplier or anyone on his behalf is lawfully obligated to disclose information that he has undertaken to maintain its confidentiality as per the terms of this Agreement, he will notify *a priori* and immediately the security representative.

6. Compliance with information security standards

6.1 The Supplier's information storage facilities, cloud services on the Supplier's behalf are required to comply with information security standards designated/adapted to a cloud environment, within up to 90 days from the date in which the contract enters into force:

6.1.1 ISO/IEC 27017

6.1.2 ISO/IEC 27018:2014

6.1.3 ISO/IEC 27036-x

6.1.4 AICPA SOC 2/3

6.1.5 27002/ISO/IEC 27001

6.1.6   ISO 27032

6.1.7   PCI DSS

6.1.8   COBIT

7. Information security

7.1 The Supplier will perform anti-virus scans exclusively on the Supplier's network and not on the Client's information.

7.2 The Supplier will provide the Client with a control system, thereby enabling the Client to monitor the origin of any connection into the system.

7.3 The Supplier will conduct penetration testing and risk surveys at least once a year. The results of the surveys and tests will be presented to the security representative once a year.

7.4 The Supplier must present a plan for correcting any findings to the extent such exist. In the case of substantial defects that have a direct effect on the system of the Ministry of Transport, the notification must be issued immediately.

8. Information security incident

8.1 The Supplier and any person on his behalf will report the occurrence of any information - security mishap that will be discovered directly to the security representative. The report will contain any incident in which there is a breach or a fear of a breach of the security instructions, including:

8.1.1   In any case of a security malfunction at either the Client's or Supplier's site, in cases relevant to the performance of the work.

8.1.2   In any event, involving an outside entity or one of his employees, or there is a suspicion of involvement that has a direct or indirect impact on the security of the Client.

8.1.3   In any violation or feared, violation of information security laws, regulations, or procedures.

8.2 The Supplier undertakes to manage reports, monitor and locate abnormal incidents, report and handle them.

8.3 The Supplier will manage a security incident diary and present them to the security representatives, as required.

8.4 The security representative is entitled to define the essence of an incident or substantial defect, its manner of reporting, the reported entities, and the recipients of the report.

8.5 The security representative has the authority to update information security guidelines following an information security incident. The Supplier must obey these demands.

9. Control and supervision

9.1 It is the authority of the security representative and any representative now authorized by the former to conduct risk surveys, surprise inspections, security checks, immunity tests, training reviews and any other audits on the Supplier's site, the purpose of which is to examine the safety of security systems, risks, the efficiency of security solutions or suspicions that have link or impact on the security of the systems used by the Client.

9.2 The Supplier will allow the Client or a person appointed on his behalf to monitor the supply and quality of the requested services, and enter for this purpose into any location, to inspect and supervise how his obligations and undertakings are carried out.

9.3 The Supplier undertakes to cooperate with the Client's representatives or any person on his behalf, concerning the security instructions of the project and will fulfill any guideline of the Client's representatives subject to the provisions of the Tender and the Agreement. This includes providing the Client's representative with any information or reporting required by them, in a timely manner and fashion determined by them; allow the Client's representative to visit his office and wherever he performs his obligations under this Agreement, to review each document and to review them in connection with the services and the performance of the Supplier's obligations under this Agreement, provided that each such visit is arranged *a priori* with the Supplier.

10. Communications

10.1 The supplier will support linking to the Client's systems in the following two alternatives:

    10.1.1 Encrypted over the Internet.

    10.1.2 Through a dedicated encrypted infrastructure between the Supplier and the Client, which will allow for continuous work if access to the Supplier via the Internet is not possible.

10.2 The Supplier will enable routing between internet communications and the dedicated infrastructure.

10.3 The provider will provide an option for cloud-based location and IP addresses.

10.4 The Supplier is required to transmit information that is in motion such as information passing between the Ministry of Transport and the cloud, between different cloud vendors or between different components within the cloud, on at least one of the following: (SSL/IPSEC/VPN/SSH and so forth.)

10.5 The Supplier will be required to secure the systems employing protection against infrastructural and applicative DDOS attacks.

10.6 The Supplier will provide an advanced security solution that provides advanced monitoring and control capabilities, prevention of malicious activity during identification, encryption at rest/in movement, documentation capabilities, and monitoring of operations and changes and other security capabilities included in this platform.

11. Securing stationary data

11.1 The Supplier undertakes to store the data of the Ministry of Transport utilizing a method such as IDA, a mechanism that allows the information stored on the Supplier's servers to be split between several different storage servers to make it more difficult for an attack to attain the information in its entirety.

11.2 The Supplier will enable the Client to encrypt sensitive information saved on a cloud through the use of a known and standard encryption algorithm.

11.3 Sensitive information is information deemed sensitive as per the Privacy Protection Law, 5741-1981, or defined as such by the security representative.

11.4 The Supplier will enable the Client to mask information on a cloud at the Client's discretion.

11.5 The Supplier will support the possibility that at least one essential field (an ID field that allows single-value identification) will be stored on the Client's network.

11.6 The Supplier and vendor must present to the Ministry of Transport the data storage architecture to enable the Ministry of Transport to identify security risks and availability controls to cope with these risks.

12. Identification

12.1 During identification into the cloud's systems, the Supplier must support at least two of the following means of identification:

12.1.1 Something you know: A lengthy and complex MFA password.

12.1.2 Something you have: A Smart Card, RSA Token, OTP Code (One Time Password) sent by SMS, or produced by way of another smartphone/device.

12.1.3 Something you are: Biometric means such as fingerprint, retina, and so forth.

12.2 If passwords are used, their use must be approved in advance. The Supplier will be required to comply with the following password policies:

12.2.1 Password complexity: A password is comprised of 12 or more characters, including large and small letters, numerals, and special signs.

12.2.2 Password validity: A password's validity will expire after a period of up to 90 days, after which the user will be required to replace it.

12.2.3 Password history: A history of at least the last ten passwords will be saved.

12.2.4 Incorrect identification attempts using any of the three mentioned identification methods would lead to the user being locked out for 15 minutes.

12.3 A fixed period will be set, after which a session time out mechanism will be activated, thereby requiring renewed user identification.

12.4 Managing authorizations and identities for the management environment of Ministry of Transport data - the Supplier is required to manage access to the cloud services by device type (desktops/laptops, smartphones, etc.), location, and addresses. Information access authorizations must be defined while granting access privileges solely to entities whose access to information is necessary to fulfill their role, for example, IAM. Access privileges to the cloud services will be administered by the Ministry of Transport.

12.5 The Supplier will enable sue of the IDM system of the Ministry of Transport or the SCIM system for managing user ID and privileges. The connection to the transportation systems will be implemented by standard protocols.

13. Managing encryption keys

13.1 The Supplier will allow the Ministry of Transport to manage encryption keys independently in the area of the organization or by a third party specializing in encryption key management.

P a g e | **54**

13.2 In the event the Ministry of Transport has determined that it wishes to manage the encryption keys on a cloud, the service provider must provide a designated component for encryption key storage and management in a secure fashion according to the Ministry of Transport specifications.

13.3 The Supplier will meet stringent security standards such as FIPS 14-2, Common Criteria EAL4 + and the like, and will support standard and recognized encryption protocols.

14. Monitoring and control

14.1 The Supplier will be required to provide reports such as SSAE 16 SOC2 or ISAE 3402 Type 2 report on controls undertaken in its area by trusted external entities that review subjects pertaining to information security, availability, integrity, and confidentiality issues, as well as privacy-related controls.

14.2 Depending on the selected service model and the type of system/information retained in the cloud, the service provider must ensure the reliability of system/component event log data defined by the Ministry of Transport as highly sensitive to system performance.

14.3 System records will be collected by a dedicated SIEM or Syslog system in the cloud or sent to the Ministry's SIEM system or another system as decided by the Ministry of Transport for monitoring and alerting of security incidents occurring in the cloud.

14.4 The supplier must allow the Ministry of Transport or anyone on its behalf to collect the system records in real-time/in a timely manner.

14.5 Logs will be transmitted in the UTC format.

14.6 The Supplier undertakes to maintain records for a variable back period according to the system's sensitivity and the regulatory specifications concerning attacks on the system.

14.7 The Supplier must verify that the system's records are saved in the central server administered by a separate team of employees.

14.8 If the Supplier changes the log system, the Client must be informed of the change 60 days in advance so that he will be able to make the necessary arrangements. The Supplier must monitor cloud services and systems at the following levels:

14.8.1 Log monitoring - real-time or retrospective detection of technical problems or information security events as they occur.

14.8.2 Performance monitoring - monitor stress loads in the cloud computerization resources.

14.8.3 Monitor abnormal/hostile activities (failed identification attempts, unauthorized access, duplicate login attempts, and more).

14.9 The Supplier will provide information on the results of penetration tests performed regularly according to generally accepted standards-compliant with information security standards.

14.10 Concerning incidents defined as high risk such as suspected foreign access and/or disclosure of information from the Supplier's database, the Supplier will immediately

update the Ministry of Transport (according to a defined checklist) and inform how the incident(s) is handled.

15. A uniform information security and defense policy for all of the customers

15.1 Customers' information is not removed from the facility by any means that is not a logic means agreed upon with the Customer.

15.2 All of the employees who have access to customer information are employees of the Company, after explicit background checks and recruitment.

15.3 The Supplier will be required to receive a priori approval for access to tables.

16. Storage and backup

16.1 The ministry will be determined where its information will be saved and that the information will not leave the boundaries of the countries appearing in the appendix of the countries where storage is permitted according to the instructions of the Governmental Cyber Protection Unit, including concerning backup sites.

16.2 Backup procedures - Every site has a "real-time" system on which the information is stored and a backup system to which the information is pushed once a day.

16.3 The Supplier will see to off-site backup.

16.4 Backup information recovery upload - falls under Supplier responsibility, management, and operation. The ministry must be informed whenever a backup information recovery upload has been performed.

17. Termination of contract with a Supplier

17.1 Upon termination or conclusion of a contract with the Supplier, the Supplier is charged with responsibility for performing the following:

17.2 A single value non-recoverable deletion of all the data and information saved in the cloud service and under the Ministry of Transport control.

17.3 Destruction of all copies of the data and information used as part of the Supplier's activities for the Ministry of Transport.

17.4 The Supplier is required to present proof that the information has been destroyed (relevant records and reports)

17.5 If the information is encrypted - cancellation and deletion of encryption keys (Revoke).

Appendix D - Agreed Compensation

Herein are events that award the Company agreed compensation for the Basic Services Phase.

Event	Duration of repair	Offset (in NIS per event)
Discontinued Supplier activity for over a week	A warning will be issued two days before the end of a week's discontinuation	NIS 2,000 for each day of discontinued activity (retroactive from the first day of discontinued activity)
Deviation from the schedule for completing the detailed characterization or for receiving completion approval	A deviation/overrun of more than seven working days from the schedule	NIS 1,000 for each day retroactively from the start of the deviant period
Replacement of a transportation planner or architect at the Supplier's initiative, until completion of the basic services	Presentation of an alternative transportation planner/architect, whose quality does not fall from those replaced, subject to the Client's approval and execution of an overlap period of at least 30 workdays at the expense of the Supplier	NIS 30,000 one time payment