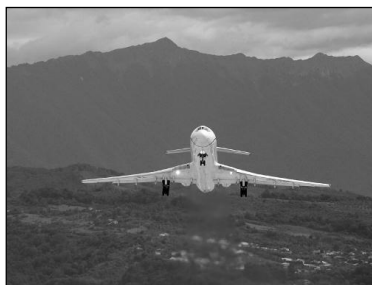


Project “Greening 2014 Sochi Olympics: A Strategy and Action Plan for the Greening Legacy”

Stage III – Action Plan



September 30th, 2012

CONTENTS

1	SUPPLEMENTARY ACTION PLAN TOWARDS THE DEVELOPMENT OF SUSTAINABLE TRANSPORT SYSTEMS FOR OLYMPIC GAMES OPERATIONS	3
1.1	Olympic Action Plan	3
1.1.1	General Action Plan.....	3
1.1.2	General Principles	6
1.1.3	Measures during Games Time	6
1.2	Optimization of spectator & workforce transport.....	7
1.3	Optimization and improvement of Sochi residents public transport offer	9
1.4	Reduction of driven bus km due to alternative modes of transport	10
1.5	Optimization of vehicle operations management and turnaround plans	11
2	RECOMMENDATIONS FOR OLYMPIC PLANNING DECISIONS	13
2.1	Sochi 2014 Public Transport Concept	13
2.2	Olympic Fleet & Bus Operations	14
2.3	Traffic Management.....	14
2.4	Further Recommendations	18
3	ELABORATION OF PROCEDURES TO IMPLEMENT INTEGRATED TRANSPORT PLANNING METHODS WITHIN MUNICIPAL AUTHORITIES, STATE AGENCIES AND SOOC	19
3.1	Prevention of congestions and transport related emissions.....	19
3.2	Improvement of public transport service as a sustainable legacy target of the Sochi 2014 Olympic Games	19

1 SUPPLEMENTARY ACTION PLAN TOWARDS THE DEVELOPMENT OF SUSTAINABLE TRANSPORT SYSTEMS FOR OLYMPIC GAMES OPERATIONS

1.1 OLYMPIC ACTION PLAN

1.1.1 General Action Plan

In order to provide an effective and well operating infrastructure it is of high importance to implement an integrated action plan which points out all general and detailed measures for each district. These measures will lead to high efficiency after the realization phase and will have a notable effect both on the infrastructure and the intermodal transport system. The following figure shows a general schedule considering the priority of each measure.

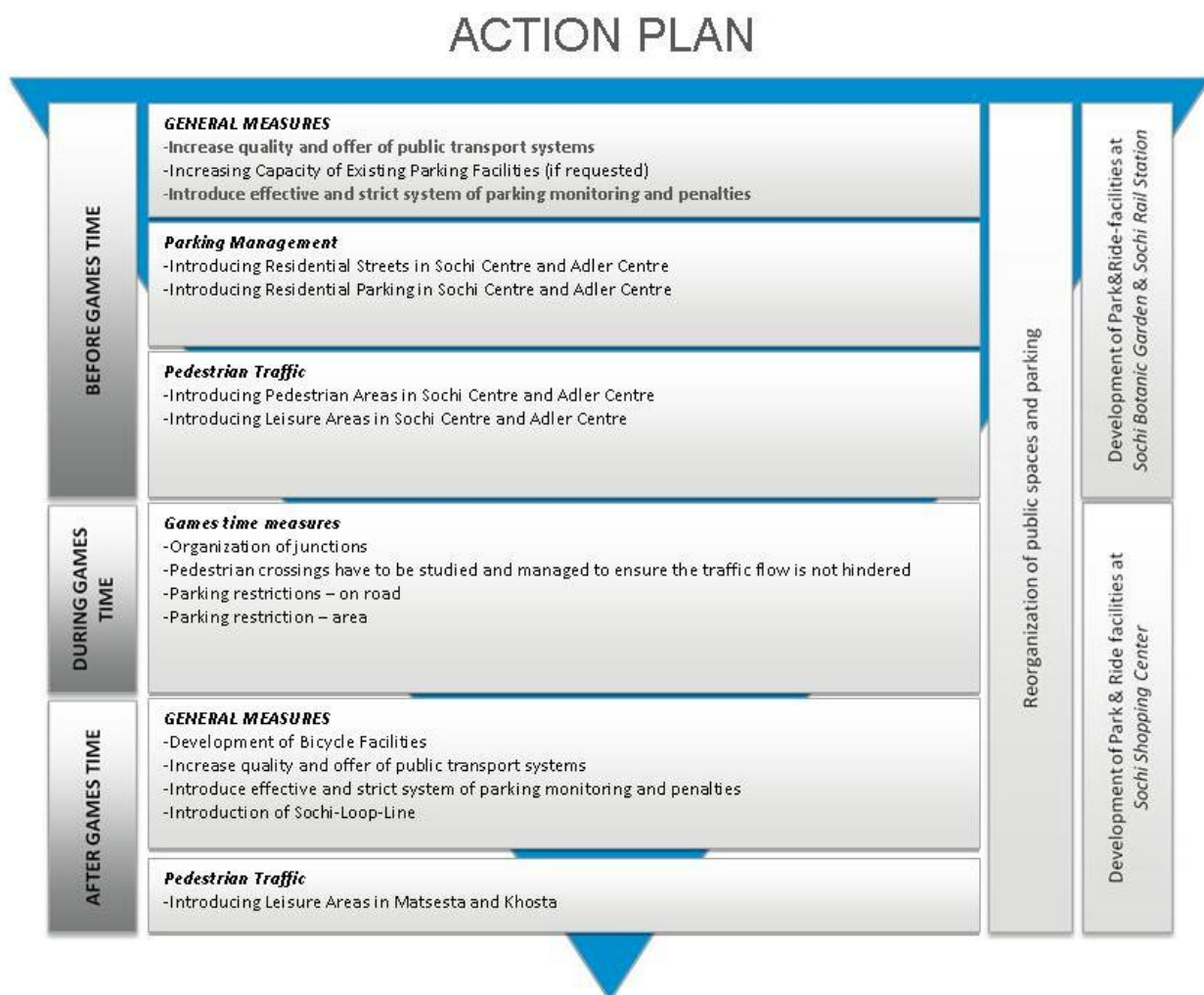


Figure 1: Action Plan

The highest priority can be assigned to the development of an attractive and efficient public transport system. In combination with the development of Park&Ride-facilities at Sochi Rail Station, Sochi Shopping Center and Sochi Botanic Garden there will be a seamless connection between individual and public traffic.

In addition to these measures the residential streets and parking areas as well as the pedestrian and leisure areas in Sochi and Adler should be developed. In context with the introduction of parking restrictions a monitoring and punishment system has to be implemented. This system has to be strictly controlled in order to reach a high acceptance of the implemented restrictions.

In combination with the reorganization of the public and parking spaces, attractive and well accessible areas in Sochi and Adler Center should be provided.

The impact of measures on parking management and pedestrian facilities during the Games time is rated very low. Rather the implemented parking monitoring has to be strictly carried out with higher charges.

After Games time the focus should be set on the continuation of the reorganization of the public spaces and parking in the area of Matsesta, Bytkha, Khosta, Kudepsta and Krasnaya Polyana. This includes the development of the living street connecting Krasnaya Polyana and Esto Sadok as well as the implementation of an integrated bicycle route concept. In addition further leisure zones should be established in these districts.

The core measure for Sochi Center will be the development of the Sochi-Loop-Line in combination with Park&Ride-facilities. This measure will complete the full connection of all transport systems and will lead to a high decrease of traffic and parking demand for the center of Sochi.





Figure 2: Detailed time schedule for the public transport system – Sochi Area

1.1.2 General Principles

The Olympic Action Plan is based on a general concept of transport management that includes travel demand management for the Sochi street network and traffic management.

- The traffic management measures will include the management of traffic flows including Olympic lanes, parking restrictions and changes to regulations.
- The travel demand management of the Sochi street network will focus on proactively altering travel behaviors and reducing traffic.

The principles which are relevant or of influence for actions of the City of Sochi can be summarized as following:

- Odd/even plate restrictions will apply along the Sochi Coast (from Magri village to the border with Abkhazia)
- Resident permit schemes will apply in the vicinity of Sochi Olympic Park, in the mountains and along the old road (A149) and combined (motor and rail) road
- Enhanced public transport will be implemented including regional buses and rail services
- Taxi services and operations will be reviewed and enhanced
- No parking for private vehicles at rail stations
- Olympic routes will have strict '**no parking**' and '**no stop**' restrictions
- Alternate public transport routes for residents will be identified to facilitate resident mobility
- Strict enforcement will be established
- Traffic command and control will be integrated and coordinated through the traffic command and control centre



Generally the main share of these principles does not have a high impact on the development of parking facilities and/or pedestrian infrastructure. These principles have an impact on transport management!

1.1.3 Measures during Games Time

The following measures have to be considered during the Games time:

- **Organization of junctions**
It is likely that a number of junctions will be closed for the many small feeder roads that intersect with road M27. At the opened junctions traffic filters will be required to limit access to the road by only correctly Olympic permitted vehicles. Lights and managed entries have to ensure effective traffic flows. This management includes the organization of parking restrictions in these areas and the guiding of pedestrian flows.
- **Pedestrian crossings**
Pedestrian crossings have to be studied and managed to ensure that the traffic flow is not hindered.

➤ **Parking restrictions - on road**

Introduction of parking and stopping restrictions along the length of the main roads has to guarantee the free flow of Olympic traffic. The parking restrictions have to be strictly monitored and delicts have to be punished. These restrictions have to be implemented on the following roads:

Sochi Center

- Kurortniy Prospect
- ul. Jegorova
- ul. Moskovskaya
- ul. Navaginskaya
- ul. Nesebrskaja
- ul. Moskvina
- ul. Ordjonikidze
- ul. Chernomorskaja

Adler Center

- ul. Lenina
- ul. Prosveschenija
- ul. Kirova
- ul. Kaspijskaja
- ul. Romashek
- ul. Molokova

➤ **Parking restriction – areal**

The introduction of areal parking and stopping restrictions should provide a constant level of quality of living for residents on the one hand. On the other hand it should avoid overloaded and queuing of vehicles in living and industrial districts. Area wide restrictions have to be implemented for the following areas:

- Sochi Center (including adjacent living districts)
- Adler Center (including living districts and the surrounding area of Adler Rail Station)
- Industrial Areas adjacent to Adler and Sochi Center

For these areas the duration of the restrictions has to be limited to the period of the Olympic Games (day 0 until day 17) and Paralympic games.



1.2 OPTIMIZATION OF SPECTATOR & WORKFORCE TRANSPORT

Planning and implementing a General Traffic Masterconcept is one of the key indicators to succeed in handling major sports events such as Olympic Games. In the specific case for the 2014 Olympic Winter Games in Sochi it is of vital importance that a suitable General Traffic Master plan based on the traffic needs and the geographical situation is being developed and implemented for the needs of the spectators and workforce transport.

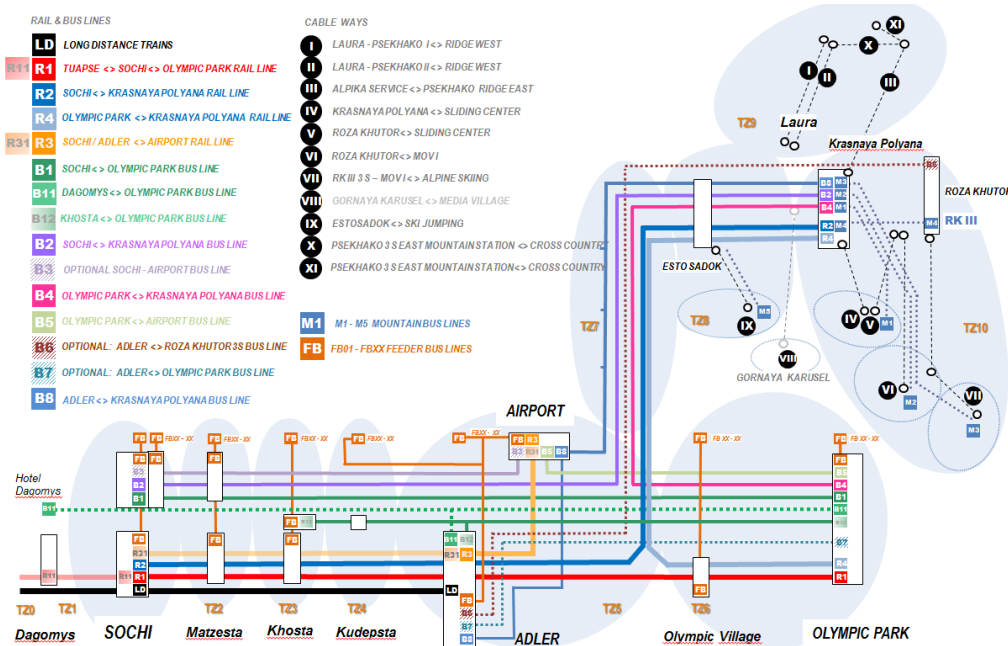


Figure 3: Dual-mode Transport System for Spectators & Workforce

The Olympic transport concept within the Sochi area consists of a dual-mode system (rail and bus) with additional restricted or dedicated individual traffic.

In order to achieve the Olympic traffic requirements, RZD built a new railway line between Adler and Krasnaya Polyana which is also connecting, improving and prolonging the base line between Sochi and Olympic Park. There will be an additional rail connection from Olympic Park to Krasnaya Polyana. The Sochi Airport, which is located in Adler, will be connected with an independent rail link to the Adler Main Station. Furthermore a substantial improvement of the traffic services along the coast line is needed to fulfil both, the Olympic and the post-Olympic demands.

To connect the mountain venues with the coast line, where most of the accommodation facilities are located, it is important to develop a high-capacity, capable, environmentally-friendly and comfortable transport connection.

Having in mind the quality and capacity of the overall traffic system in the Sochi Olympic Region it is also necessary to improve road connections and other secondary infrastructure.

Bus lines such as feeder connections, direct or mountain lines together with lifts and cable cars are completing the public transport system.

Under Olympic conditions most of the roads with limited capacity will be restricted for private individual motorized traffic, so that it is guaranteed that the public bus traffic as well as the Olympic Family transport can be operated on a high level of punctuality.

1.3 OPTIMIZATION AND IMPROVEMENT OF SOCHI RESIDENTS PUBLIC TRANSPORT OFFER

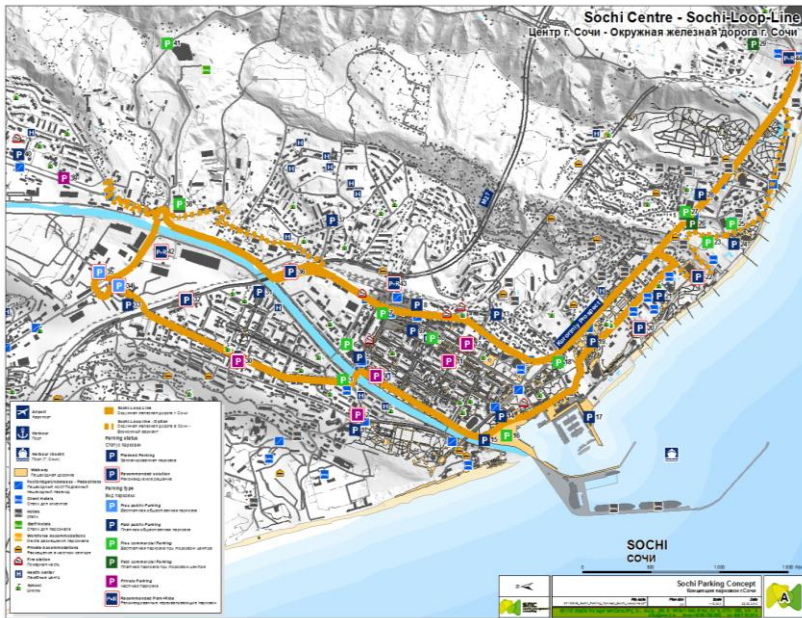


Figure 4: Sochi-Loop-Line for Residents

To be able to change the present parking situation and to increase the living and recreation quality for residents of the central area of Sochi one of the core requirement is a redesigned public transport system and a strict redesign of different roads which currently absorb main shares of the Sochi through-traffic. This traffic has to be transferred onto the new built M27.

To provide an attractive public transport offer it is recommended to introduce a “Sochi-Loop-Line” which connects points of interest within the central area with the surrounding public traffic systems and Park&Ride infrastructures. Figure Nr. 4 is showing a supposable solution for the routing of such a loop-line.

		DIESEL BUS	GAS BUS NATURAL GAS	GAS BUS BIOGAS 2002	TROLLEY BUS HYDROPOWER	TRAM HYDROPOWER
EMISSIONS	CO2	☹	☹	☺	☺	☺
	NOX	☹	☺	☺	☺	☺
	SO2	☺	☺	☺	☺	☺
	PARTICULES	☹	☹	☺	☺	☺
	LIFETIME	☺	☺	☺	☺	☺
COSTS	STAFF COSTS	☺	☺	☺	☺	☺
	VARIABLE OPERATING COSTS	☺	☺	☺	☺	☺
	FIXED OPERATING COSTS	☺	☺	☺	☺	☺
	CAPITAL COSTS VEHICLE	☺	☺	☺	☺	☹
	INFRASTRUCTURE COSTS	☺	☺	☺	☺	☹

Figure 5: Vehicles proposed for the Sochi-Loop-Line

1.4 REDUCTION OF DRIVEN BUS KM DUE TO ALTERNATIVE MODES OF TRANSPORT

CITY CONCEPT	
NO. of lines	110*
NO. of buses	568*
large buses	182*
medium buses	253*
mini buses	133*
service km peak day 24 hours	51528,8km/24 hours **

Figure 6: City Concept (proposed by Sochi Administration Nr. 211/18-46)

The bus system suggested by the Sochi Community is not structured according to principles of an intermodal system

- There are insufficient links of bus lines to the railway and to the spine line (to less intermodal links).
- The large number of bus routes to Sochi Central Hub does not allow traffic-jam-free processing in the hubs.
- The high number of buses increases the traffic-jam situation on the streets.
- The functioning of the whole Olympic bus and rail system is not guaranteed.

SMC CONCEPT	
NO. of lines	59**
NO. of buses	283**
15m buses	58**
12m buses	25**
medium buses	193**
mini buses	8**
service km peak day 24 hours	83509,415km/24 hours **

Figure 7: SMC-Concept (proposed by SMC in coordination with Sochi Administration)

The bus system is structured according to principles of an intermodal system:

- There are 7 links to the railway lines, bus lines and 10 links to the spine lines.
- The loading factor in the hubs was significantly reduced.
- The lower number of buses reduces the traffic-jam situation on the streets.
- The integral time interval system is very simple and very attractive due to the high density.
- The functioning of the whole Olympic Bus and Rail System is guaranteed.

With only 59 lines and 283 buses including redesigned bus routes a much higher efficiency grade as well as a significant reduction of the driven bus km can be reached.

1.5 OPTIMIZATION OF VEHICLE OPERATIONS MANAGEMENT AND TURNAROUND PLANS

The following graph shows the schematic optimization process of all vehicle operations including bus and rail.

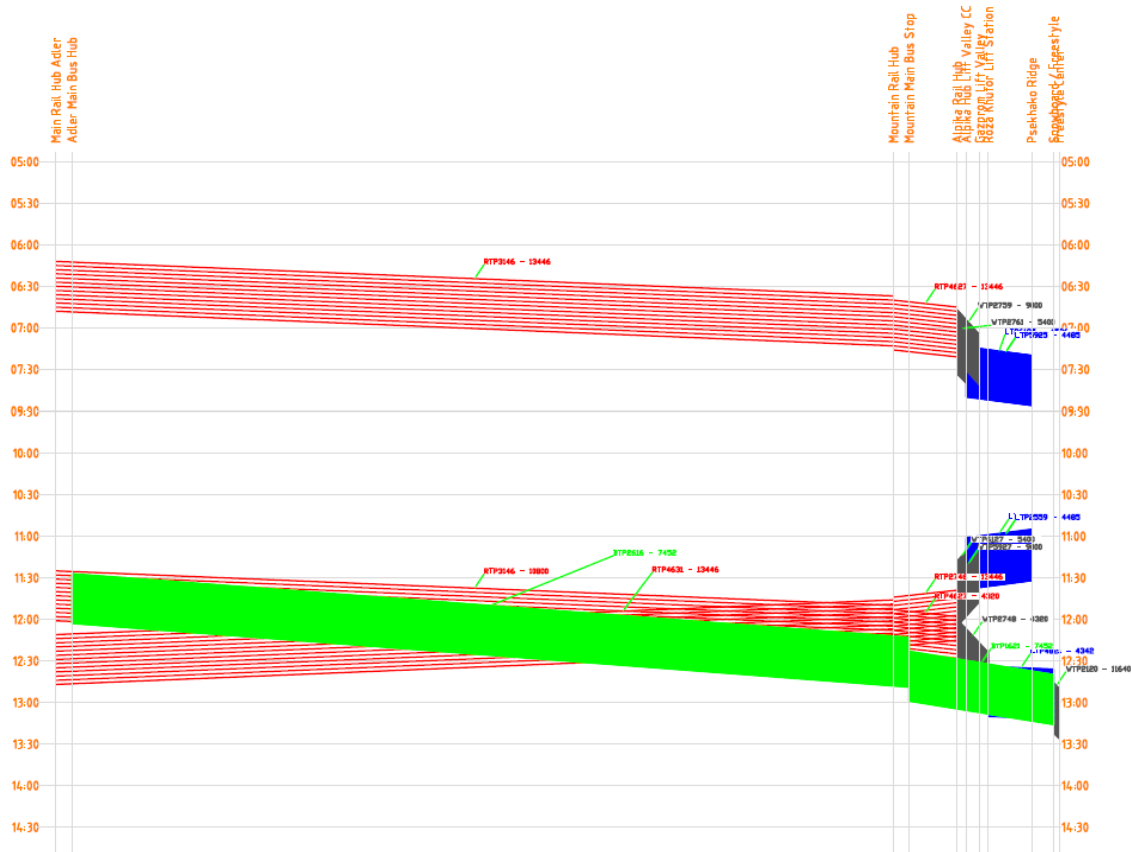


Figure 8: Time-Distance Diagram

A time-distance diagram, also called graphical schedule, is generally a diagram representing transport movement. With this tool the operations of a bus, train or cable car can be shown. Furthermore the time-distance diagram can hold encounters, walkways, crossings and overhauls at a glance. All other documents that are important for vehicle operations management can be derived from the time-distance diagram which is an important tool for capacity planning and the development of the functionality of an intermodal transport hub.

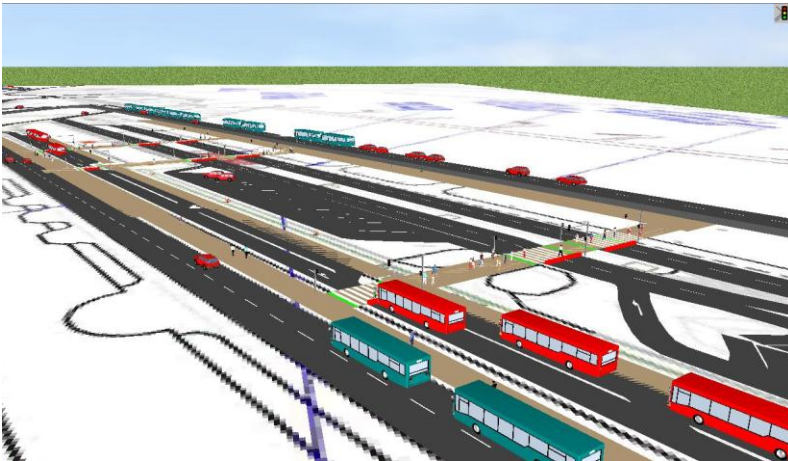


Figure 9: Bus Operations Optimization

The optimization of hubs and change points can be calculated with the support of Micro vehicle flow simulations. Hubs and terminals must be efficiently operating in different modes.

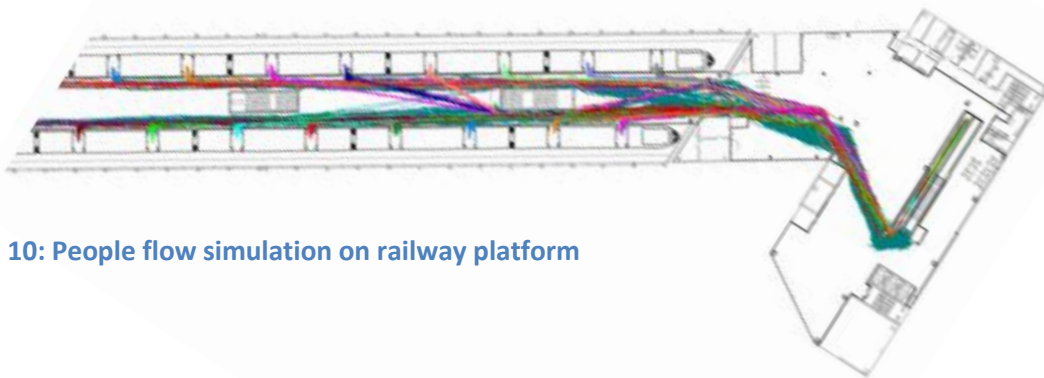


Figure 10: People flow simulation on railway platform

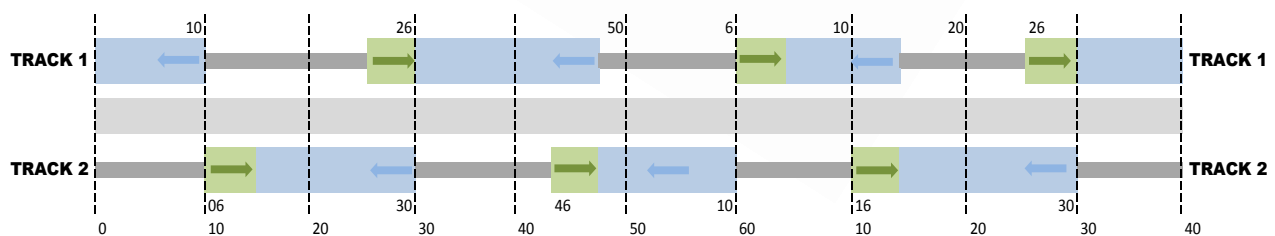


Figure 11: Turn Around Concept - Rail

2 RECOMMENDATIONS FOR OLYMPIC PLANNING DECISIONS

2.1 SOCHI 2014 PUBLIC TRANSPORT CONCEPT



Figure 12: Public Transport System

At the heart of the 2014 transport operations lies a reorganized and new public transport concept. This transport concept uses newly built transport infrastructures and connects them to a multimodal transport network with a mass transit spine network and several interchange nodes (hubs).

The backbone of the transport concept is the new railway line to Krasnaya Polyana and the modernized 2-track along the coast, as well as the Adler – Airport Railway. It is supported by spine and feeder bus lines to the railway stations at the coast. In the mountain cluster the railway connects to cable cars and mountain bus lines.

Scope of the Olympic Transport:

- 7,7 Million People Trips during the Games (407 Million people kilometre)
- 505,000 Vehicle Trips during the Games
- 338.505 Railway Kilometres (4.080 trips)
- 4,85 Million Olympic Bus System Kilometres
- 1,73 Billion People Kilometres (excluding car fleet)

The general background traffic in several districts in the vicinity of Imeretinskij lowland and Adler will be restricted during Games time. Only residents (with residents' permits), Games fleet and system vehicles (with a vehicle pass) are allowed in these perimeters.

Travel distances and time are very important elements of any Olympic Transport Plan. Clients need accurate information to plan their operations and journeys, and all Olympic Transport systems are planned on the official times. Therefore a very important and critical aim of the Traffic Management plan is to ensure that travel times are achieved.

Signage is an important element of any traffic management plan. It requires careful planning and implementation.

Traffic command and control forms a very important part of the Traffic Management plan. The plan agreement and enforcement will require cooperation and integration with the Traffic Police and other traffic enforcement agencies. A key success factor will be to ensure adequate resources and efficient command and control to implement the Games-time traffic measures. The Sochi Bid outlined that the traffic command and control centre will be operated under the supervision of the Olympic Transport Authority.

Transport Information

The "Organizing Committee of Olympic Games" recognizes the importance of providing accurate and timely information regarding their transport services and the overall Olympic Transport Plan to Olympic Family during pre-Games and Games-time. Olympic and Paralympic Transport Guides will be prepared and distributed widely, and a special transport section on the website will provide schedules and suggest routes from all transport zones to all venues.

Transport Workforce

The Olympic Transport workforce is one of the largest in the "Organizing Committee of Olympic Games", normally comprising between 20 – 25% of the overall Games workforce. The "Organizing Committee of Olympic Games" will plan and implement a workforce recruitment program to ensure the appropriate workforce is in place; the right numbers, at the right time with the right skills, support and knowledge to deliver outstanding transport services and operations. Careful attention to training will be applied, in particular for drivers, to ensure

Sochi's goal of 'exceeding service expectations' is realized. To these ends, plans are already under development with the Ministry of Transport to identify drivers within the cadre of the ministry and ensure their training will be of top quality. The "Organizing Committee of Olympic Games" is also planning with its vehicle partner to have a training program for drivers on the vehicles' proper use in mountains and Sochi City.

Vehicles, Depots, Support Areas and Services

The "Organizing Committee of Olympic Games" has identified that approximately 4.300-4.500 fleet vehicles and 1.300 buses will be required to deliver Olympic Family, Workforce, Ratecard and Spectators Transport Services. There are a number of possible procurement options that the "Organizing Committee of Olympic Games" will review to procure the required vehicles (and drivers).

The "Organizing Committee of Olympic Games" is also considering environmental aspects when developing the specifications for the provision of vehicles. A core theme of the Olympic and Paralympic Games is the consideration of environmental issues when delivering services. All vehicles will be compliant with the appropriate regulations in force at the time. Wherever possible, the use of green technologies will be required. This element has been included in the terms under discussion with the vehicle partner. The parties have agreed to maximize their efforts to put a "green fleet" on the road.

Transport depots

The "Organizing Committee of Olympic Games" will require a number of strategically located depots to effectively manage the fleet vehicles and buses. The number and location of the depots will be developed, with the overall aim to ensure client focused services and systems that are delivered in the most cost effective and efficient manner possible.

In addition to the spaces at the venues for transport operations, it is likely that a number of other areas will be required 'off-venue' for transport operations and support. The use of these areas includes but is not limited to vehicle turnaround, transport malls and driver rest. The "Olympic Games Transport Directorate" will continue to project the amount of space required in order to deliver the transport services and to ensure that they are available.

Implementation of a uniform ticket system

In order to provide a seamless intermodal system, a uniform ticket system is suggested. The advantages of a unified plan are above all to simplify the pricing for each route. The following figure shows an example of a zone pricing system.

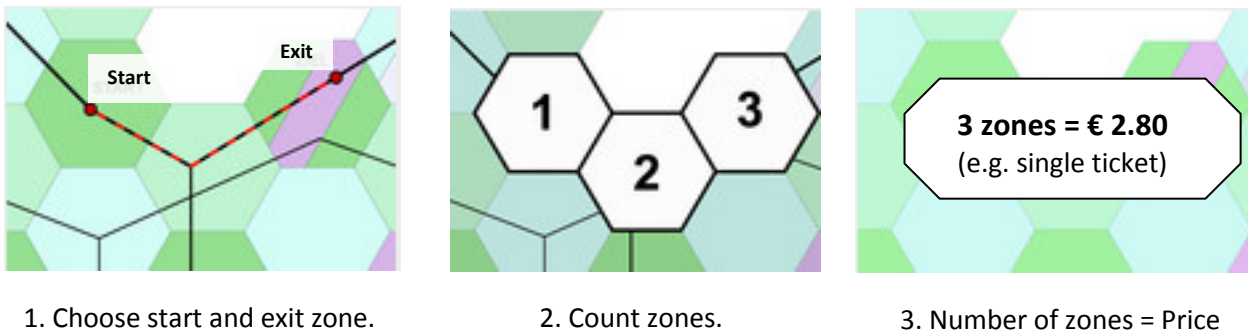


Figure 14: Example of a zone pricing system

The comb system enables simple and fair pricing. One counts the number of zones between the start and exit station. The number of zones will then determine the price that can be found in the table of tariffs. The zone ticket is valid for all means of transport within the zone.

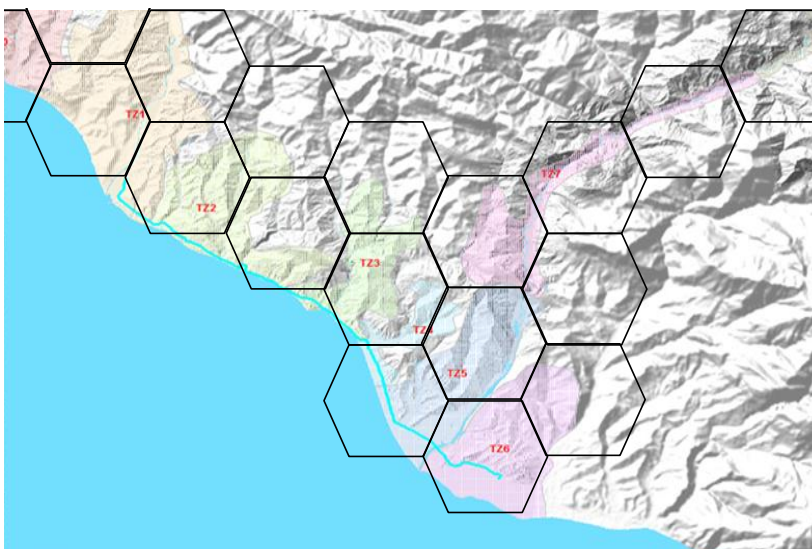


Figure 15: Example of a unified plan

2.4 FURTHER RECOMMENDATIONS

Increasing Capacity of Existing Parking Facilities

If a higher parking demand can be estimated for local areas the increase of capacity of existing parking facilities can partly satisfy the additional demand. This can be done without using more land or major construction only by redesigning the parking facilities. The following methods can be used to increase the parking supply in existing facilities:

- Use currently unused areas (corners, edges, undeveloped land, etc.). This can be particularly appropriate for small car spaces, motorcycle and bicycle parking.
- If the walkways have an adequate width and if there is adequate total street width it is possible to change from parallel to angled on-street parking.
- Provide special, small parking spaces for motorcycles. Allow and encourage motorcycles to share parking spaces when possible.
- In long term parking areas (employees, residents) the parking space size can be reduced to achieve a higher number of parking spaces. Short-term parking requires larger spaces due to load/unload operations.
- In some cases it is possible to use car stackers in existing parking buildings. These can significantly increase the number of vehicles parked in an area/building. Note that they generally require an attendant. In addition stackers may be unable to accommodate larger vehicles such as SUV, vans and trucks.
- Remove or consolidate non-operating vehicles, equipment, material and junk stored in parking facilities, particularly in prime locations.

Bicycle Facilities

In addition to the planned bike rental stations, bicycle parking and maintenance facilities should be established as part of a comprehensive bicycle improvement and encouragement program. Such facilities increase the attractiveness of bicycle transportation. The optimal bicycle parking supply has to be estimated on the level of cycling that occurs in the districts of the city of Sochi and has to be investigated independently in a separate project. Some destinations, such as schools, campuses and recreation centers have 10-20% of visitors arriving by bicycle, at least during fair weather.

3 ELABORATION OF PROCEDURES TO IMPLEMENT INTEGRATED TRANSPORT PLANNING METHODS WITHIN MUNICIPAL AUTHORITIES, STATE AGENCIES AND SOOC

3.1 PREVENTION OF CONGESTIONS AND TRANSPORT RELATED EMISSIONS

According to the Kyoto Protocol 1997, all countries are bound to a global reduction of greenhouse gas emissions in the period of 2008-2012 (with an average reduction of 5.2%). With its signature Russia accepted the Kyoto target in 2004 as well.

At present there are congestion hours all day long on the streets in Sochi which are resulting in high CO₂ emissions. Traffic jams are responsible for a decrease in productivity and the effects on the environment in the form of additional CO₂ emissions and higher fuel consumption are huge!

From an environmental point of view push and pull measures lead to a high CO₂ reduction. An average fuel consumption in a traffic jam from 1 to 1.5 liters of gasoline per hour with the engine running (more with air condition) gives an additional CO₂ emission of approximately 3,500 tons of CO₂ per day (2.36 kg CO₂/l petrol) – counted only on the streets around Sochi.

"Green Transportation and Logistics" is increasingly relevant for the Sochi Administration. The call for sustainable transport is steadily louder. To obtain quality tourism and further improve the politics of the Sochi region it is recommended to deal intensively with environmental issues and to work on measures that result in a reduction in CO₂ emissions.

3.2 IMPROVEMENT OF PUBLIC TRANSPORT SERVICE AS A SUSTAINABLE LEGACY TARGET OF THE SOCHI 2014 OLYMPIC GAMES

The implementation of an intermodal transportation system during the Olympic and Paralympic Games will show the residents the benefits of such a system. There are hopes that through specific **push and pull measures** Sochi goes a new way to a "Green Transportation and Logistics".

List of Figures

Figure 1: Action Plan.....	3
Figure 2: Detailed time schedule for the public transport system – Sochi Area.....	5
Figure 3: Dual-mode Transport System for Spectators&Workforce.....	8
Figure 4: Sochi-Loop-Line for Residents.....	9
Figure 5: Vehicles proposed for the Sochi-Loop-Line.....	10
Figure 6: City Concept (proposed by Sochi Administration Nr. 211/18-46).....	10
Figure 7: SMC-Concept (proposed by SMC in coordination with Sochi Administration)	10
Figure 8: Time-Distance-Diagram.....	11
Figure 9: Bus Operations Optimization.....	12
Figure 10: People flow simulation on railway platform	12
Figure 11: Turn Around Concept - Rail.....	12
Figure 12: Public Transport System	13
Figure 13: Olympic Fleet for Spectator & Workforce Transportation.....	14
Figure 14: Example of a zone pricing system.....	17
Figure 15: Example of a unified plan	17



September 30th, 2012 – Masterconcept Ltd

Developer:

Gernot Leitner – Managing Director and Architect

Guenther Penetzdorfer – Public Transport Expert

Walter Weber – Sochi Regional GIS data base

Paul Freudensprung – Event Operations Director

Volker Alberts – Traffic Planner



In cooperation with:

Spatial Management Consulting Ltd