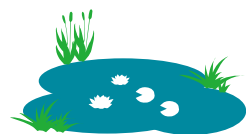
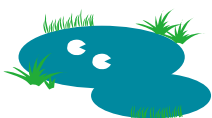




Environmental Initiatives on the Metropolitan Expressway



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Connecting with Intercity Expressways and Enhancing Roadside Environments (Mid-1970s to late 1980s)

Traffic volumes surged as the Metropolitan Expressway joined up with intercity expressways such as the Chuo Expressway, Tohoku Expressway and Joban Expressway. In tandem, problems began emerging in the roadside environment (the environment near expressways). Noise barriers, environmental-facility belts and other roadside environmental measures began to be put into place.



Serious Measures Against Pollution (Mid-1960s to mid-1970s)

As road-traffic congestion continued to intensify, work proceeded on construction of the Metropolitan Expressway. The Kanagawa section opened to traffic in 1968. By 1973 the length of the Metropolitan Expressway exceeded 100 km. Meanwhile, awareness of pollution issues was rising among the Japanese people, as evidenced by the passage of the Environmental Pollution Prevention Act and discussion of pollution in the Diet.



The Metropolitan Expressway Began with the Tokyo Olympics (Mid-1950s to mid-1960s)

The rapid motorization of Japan from the late 1950s onward brought enormous congestion to the streets of central Tokyo. This concern, together with the selection of Tokyo as the venue for the 1964 Olympics, spurred the construction of the Metropolitan Expressway at a breakneck pace. In December 1962, the first expressway, covering 45 km between Kyobashi and Shibaura, opened to traffic. This was followed by another 33 km section by the start of the 1964 Tokyo Olympics, enabling large numbers of spectators and athletes to use it to travel from Haneda Airport to the National Stadium and Olympic Village.



SUSTAINABLE DEVELOPMENT GOALS

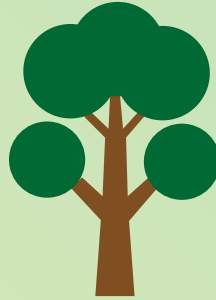




Network Expansion and Cityscape (Late 1980s to late 1990s)

By the end of the 1980s the Metropolitan Expressway had been extended to over 200 km. The network had continued to expand, with the opening to traffic of the Bayshore Route and Saitama Omiya Route.

At the same time, concern was growing about the effect of expressways on the cityscape. Metropolitan Expressway took steps to improve the cityscape, overhauling the designs of major bridges and beautifying viaducts on routes in operation.



New Measures for Harmony with Regional Communities (Late 1990s to late 2000s)

In consideration of roadside environments, Metropolitan Expressway moved ahead with the construction of tunnels for new routes. Responding to general public demand for a deeper relationship with the environment, the Company undertook new environmental measures toward harmony with regional communities, such as preserving biodiversity and reducing energy consumption.



Toward a Sustainable Society (Late 2000s to present)

Metropolitan Expressway carries out painstaking inspection and appropriate repairs on a daily basis. We are constantly upgrading our expressways to ensure their long-term soundness.

By upgrading infrastructure, we are enhancing the efficiency of maintenance while contributing to reduction of environmental impact.



Our Stance on Environmental Action

**We strive to contribute to a sustainable society
while preserving regional and roadside environments,
to achieve a better environment and harmony
with regional communities.**

SDGs

Adopted at a summit of the United Nations in September 2015 with the approval of 193 member nations, the Sustainable Development Goals (SDGs) consist of 17 goals for the future of the environment, society and economies. Declaring that the world's countries were committed to efforts beyond their individual interests, the stated aim of the SDGs is to make the world of the future a better place for all.

Designations in this document: Junctions are marked "JCT." Parking areas are marked "PA."

To organize its stance on environmental measures in concrete terms, Metropolitan Expressway establishes four pillars of environmental action, supported by a common platform of environmental management.

Stance on Environmental Action



1. Toward a Low-carbon Society

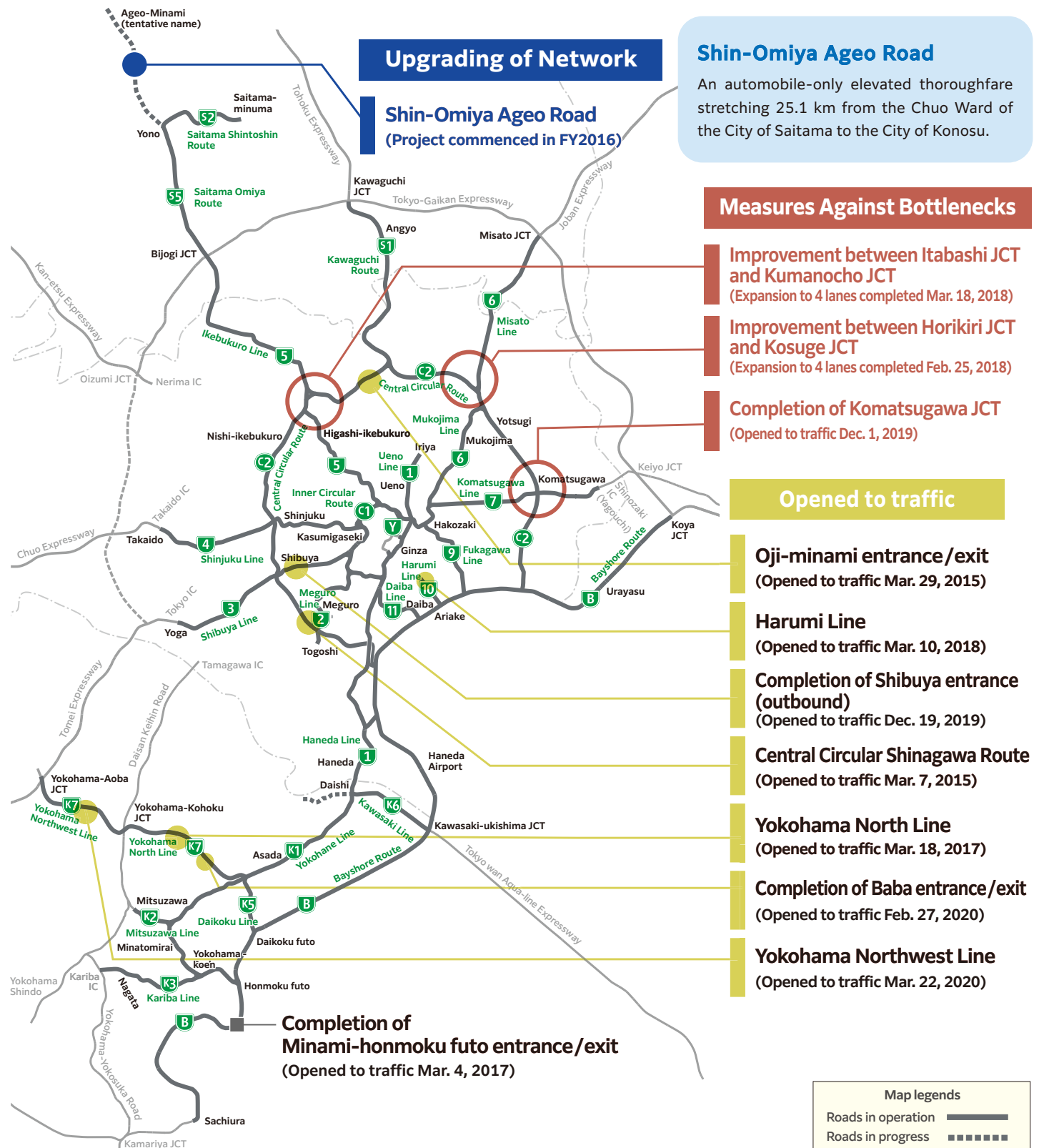
The Strength of Our Network

Upgrading Our Network

By moving forward with the upgrade of the Metropolitan Expressway network, we are continuing to care for road traffic in the city center, contributing to smooth traffic flow, and providing relief of congestion on city streets.

Broadcasting of Traffic Information

Metropolitan Expressway broadcasts traffic information to assist drivers in selecting routes, thereby contributing to relief of traffic congestion.



We are striving to reduce automobile CO₂ emissions by relieving congestion.
We are also working to reduce CO₂ emissions related to maintenance work.

Measures Against Bottlenecks

To leverage the network functions of the Central Circular Route to maximum effect, Metropolitan Expressway took steps to relieve bottlenecks, such as adding lanes, and built new junctions.

1. Improvement between Itabashi JCT and Kumanochi JCT
2. Improvement between Horikiri JCT and Kosuge JCT
3. Komatsugawa JCT
4. Shibuya entrance (outbound)



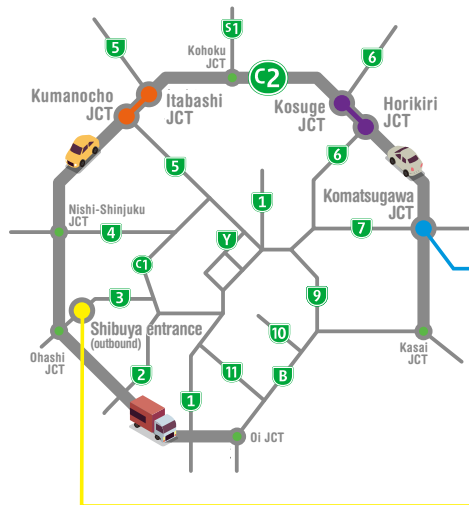
Upgrading effects from the opening to traffic of Komatsugawa JCT and

③ Shibuya Line (outbound) Shibuya entrance

Using the Shibuya entrance (outbound), approximately 40% of traffic heading from the Shibuya area toward Haneda Airport uses the Central Circular Route (during the evening peak).

For traffic heading from the Shibuya area toward Saitama, the Central Circular Route is expected to provide a redundancy function with the Inner Circular Route.

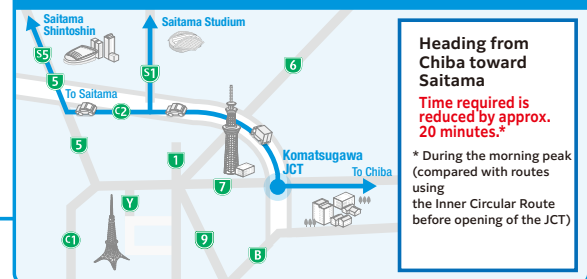
Using Komatsugawa JCT, approximately 80% of traffic between Saitama and Chiba uses the Central Circular Route (during the morning and evening peaks).



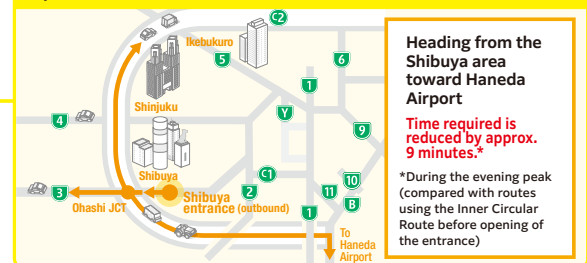
▶ Access from Shibuya heading to the suburbs is improved, enabling selection of routes using the Central Circular Route (C2).

▶ The Central Circular Route (C2) can be selected as a route between Saitama and Chiba.

Komatsugawa JCT connecting traffic between ② Saitama and ⑦ Chiba opened to traffic in December 2019

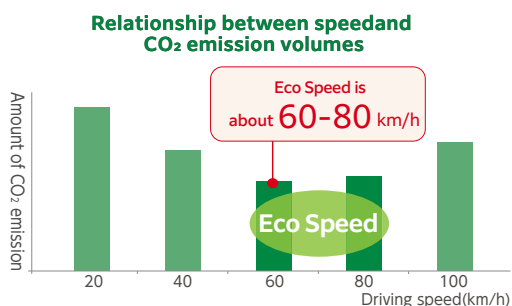


③ Shibuya Line (outbound) Shibuya entrance opened to traffic in December 2019



Reduction of CO₂ Emission Volumes

Measures such as upgrading the network and eliminating bottlenecks enable drivers to drive at speeds that are friendly to the environment ("eco-speed"), thereby reducing CO₂ emission volumes.



Escort Lights

Escort lights are guide lights for speed recovery that are installed at roadside.

Their purpose is to prevent drivers from slowing down without realizing it at locations such as on uphill sections and near the exits of undersea tunnels.

Locations installed with escort lights

7 locations



Increasing Energy Efficiency



Reducing Energy Consumption

Metropolitan Expressway is replacing conventional road lighting with LED lighting to save energy. We are also switching scenic illumination of large bridges to LED for further energy savings.



Energy savings from switching to LED

Approx. **70%** reduction
(from 190 kWh to 50 kWh)*

*Energy savings at Rainbow Bridge

Introduction of Renewable Energy

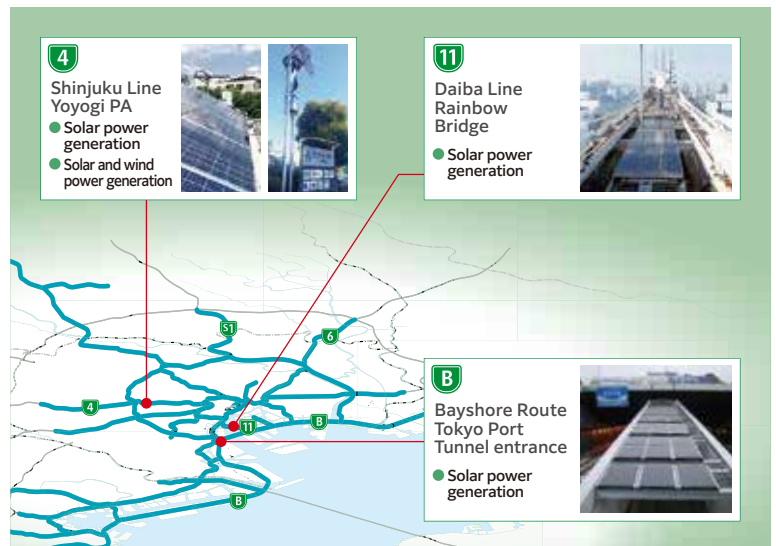
We are installing solar- and wind-power generating facilities at parking areas and tunnel mouths throughout the Metropolitan Expressway.

The power generated by these systems provides a portion of the energy used by climate-control equipment inside tunnels and for lighting in parking-area buildings and washrooms.

Electrical power generated
Approx. **150 kW**

Renewable-energy equipment
9 locations

Locations of major renewable energy facilities



Environmentally Friendly Parking Areas

At Oi PA (eastbound and westbound) on the Bayshore Route, Yoyogi PA and Kahei PA, a number of technologies are installed to make these parking areas environmentally friendly. These include low-flush toilets, solar LED blocks and LED downlights.



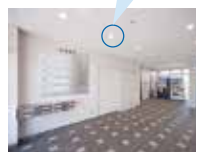
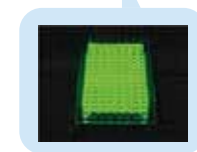
Low-flush toilet



Solar LED block



LED downlights



Rapid Chargers for EVs

As one measure in the fight against climate change, we support the widespread adoption of low-carbon vehicles by installing rapid chargers for electric vehicles (EVs) at parking areas throughout the Metropolitan Expressway.

Rapid-charging equipment for EVs

8 locations



2. Toward a Society in Harmonious Co-existence with Nature

Metropolitan Expressway is preserving biodiversity by restoring nature in various locations. We are also “greening” numerous road sections by planting trees and shrubs. Our aim is to connect with local communities by fostering a shared harmony with nature.

Preserving Biodiversity

To support and regenerate regional ecosystems, Metropolitan Expressway is promoting biodiversity through nature regeneration focused on native species.



Ohashi JCT



Ohashi JCT, location of the Ohashi Sato no Mori reforestation project, is a loop junction that connects the Route No.3 Shibuya Line, which runs above National Route 246, with the Central Circular Route (Yamate Tunnel). Ohashi JCT is an urban oasis of green, thanks to measures to enhance local plant life from three perspectives: Greening the cityscape, greening parks, and greening to restore nature. Metropolitan Expressway took these measures from a number of perspectives, including counteracting the heat-island effect, restraining global climate change and preserving biodiversity.

Greening to Restore Nature Ohashi Sato no Mori

Ohashi Sato no Mori is a nexus in an ecological network that connects local flora with the natural heritage of the Meguro River.



Greening Parks Meguro Sky Garden

Japan's first public park built on the roof of an expressway junction

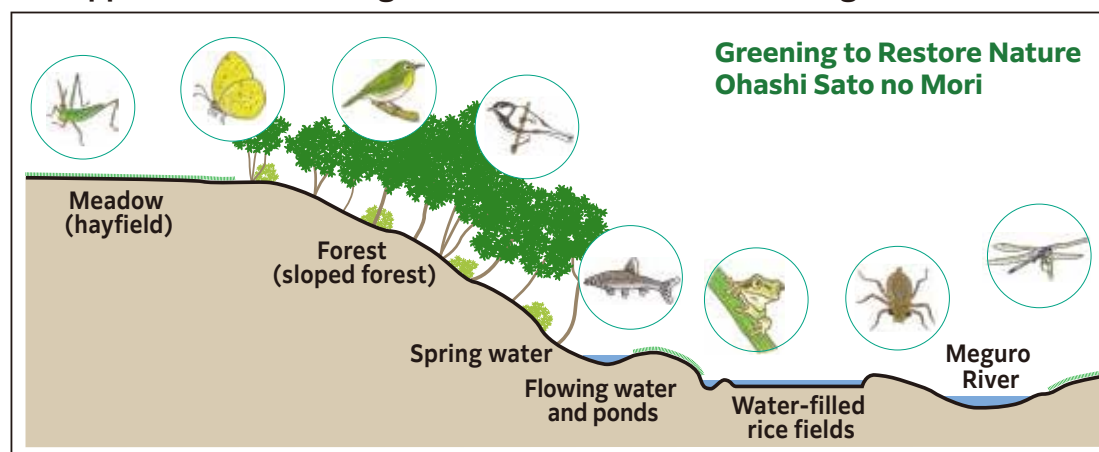


Greening the Cityscape Greening the Walls

Plant life is added to walls, to blend harmoniously with the surrounding environment. Here creeping fig (*Ficus pumila*), an evergreen ivy, is planted.

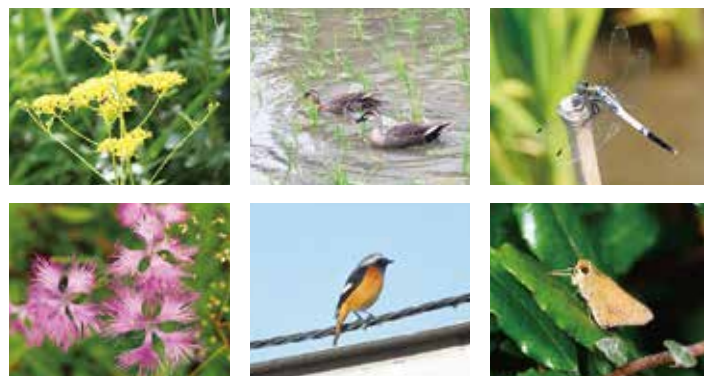


The appearance of the Meguro River environs before the region's urbanization

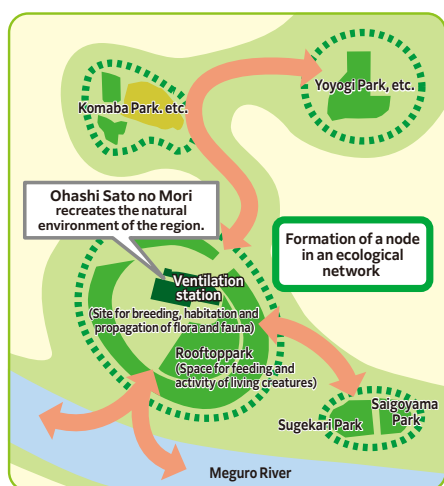


Ohashi Sato no Mori plays the role of a node in an ecological network encompassing nearby natural preserves, which comprise the Meguro River and other greenery areas such as Yoyogi Park.

Signs of the success of this ecological network have become evident in recent years. For example, signs of feeding by the northern goshawk (*Accipiter gentilis*) have been found. In the Red List published by the Ministry of the Environment, the northern goshawk is listed as “NT” (near-threatened).



Many species of plants and animals inhabit Ohashi Sato no Mori. The park's appearance reflects their presence as it changes with the passing seasons.



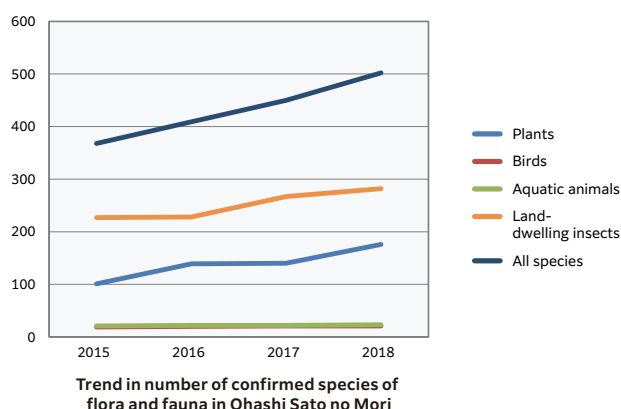
Schematic view of an ecological network



Courtesy of: Bureau of Environment, Tokyo Metropolitan Government



Prey remnant



Trend in number of confirmed species of flora and fauna in Ohashi Sato no Mori



Ohashi Sato no Mori assiduously cultivates native species. It is listed in EDO-MIDORI Registration Green Space, recorded and published by the Tokyo Metropolitan Government, as a green space that contributes to the preservation of biodiversity.

Hands-on Learning about Rice Cultivation in Ohashi Sato no Mori

Metropolitan Expressway invites groups of primary-school pupils from nearby communities to take part in activities such as hands-on learning about rice cultivation (planting, reaping, threshing) and nature observation. Later, a “harvest festival” is held, in which children get to eat the rice they grew as part of their school meals. These exercises provide the pupils with multifaceted learning experiences about nature, food cultivation and more.



Planting



Nature observation event



Reaping



Threshing



Harvest festival

Comment from the Natural Environment Division, Bureau of Environment, Tokyo Metropolitan Government :

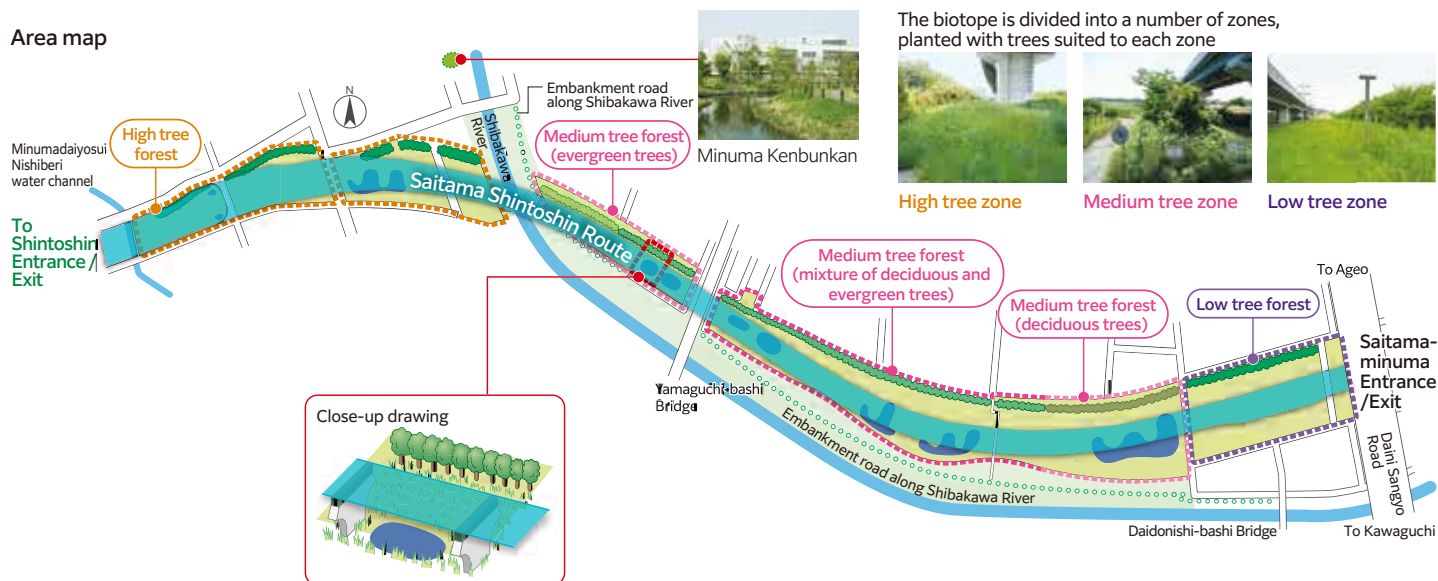
Ohashi Sato no Mori recreates the pre-urbanization appearance of the Meguro River environs. Painstaking measures are also taken to protect the ecosystem, for example by refraining from the use of agricultural chemicals. It is a “superior green space,” a place that expands the network of living things and contributes to improving biodiversity in Tokyo. Hands-on rice cultivation, general public events and other happenings at Ohashi Sato no Mori are amazing, because they convey the richness of the natural world to children and residents.

Minuma Tanbo Shutoko Biotope



The Minuma Tanbo area on the Saitama Shintoshin Route is an expansive green space of 1,260 ha straddling the Cities of Kawaguchi and Saitama. To protect Minuma Tanbo, as one of the few green spaces remaining on the outskirts of Tokyo, a biotope has been established here, measuring 1.7 km in length and 6.3 ha in area.

Area map



At Minuma Tanbo Shutoko Biotope, Metropolitan Expressway is conducting an activity called the Hannoki Project. The Hannoki Project is a natural regeneration project. The *Neozephyrus japonicus* is a butterfly species native to Saitama Prefecture. In the Saitama Prefecture Red Book, this butterfly is listed as "near threatened." To effect recovery of this species, the Japanese alder (*Alnus japonica*), called hannoki in Japanese, is being planted in Minuma Tanbo Shutoko Biotope, as the larvae of *Neozephyrus japonicus* feed on this tree.



Planting Japanese alder (2011)

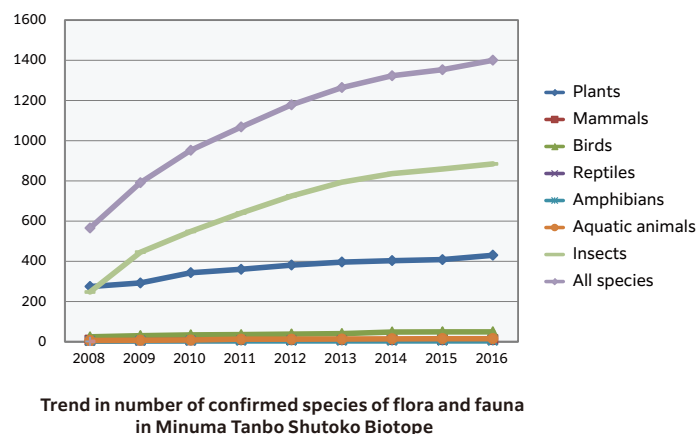
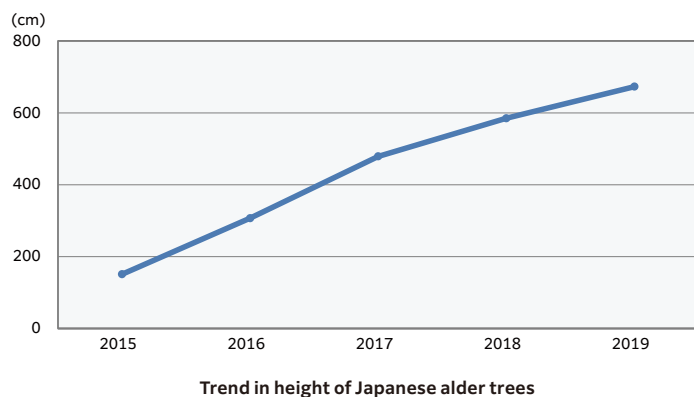


Measuring the height of Japanese alder (2019)



Will we meet again before long?

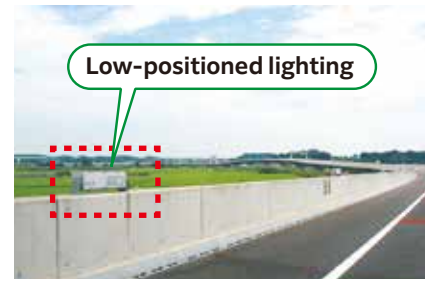
Courtesy of: Ecosystem Conservation Society-Saitama



Installation of Lighting in Consideration of Flora and Fauna

To protect the living things in the biotope, low-positioned lighting is installed. This step was necessary to prevent light leaking from viaducts of the Metropolitan Expressway at night from affecting the biota and to prevent them from mistaking night as day.

Light fixtures were placed in boxes and installed on railings on both sides of the viaduct, about 1 m tall from the road surface. They were positioned to illuminate only the road surfaces in the direction of automobiles' movement.



Greening the Roads

In roadside areas and at expressway spaces such as parking areas and junctions, Metropolitan Expressway is adding greenery such as shrubs and flowers, in consideration of the surrounding environment and maintenance. By creating these green spaces, we are improving the driving environment, creating a more beautiful urban milieu.

We are also greening the roof of Yoyogi PA and the roof and walls of Nishi-shinjuku Ventilation Station as part of efforts to reduce the heat-island effect. In a "roof and wall greening technology contest" held in 2019, the Kirin green space under viaducts on the Yokohama North Line and the Kishiya-namamugi Line won the MLIT Minister's Award.



Daishi JCT



Greening of the walls of the Nishi-shinjuku Ventilation Station

Award-winning organizations: Kirin Brewery Yokohama , Kirin Brewery Co., Ltd.; City of Yokohama Hall; Metropolitan Expressway Co., Ltd.; and Uchiyama Landscape Construction Co., Ltd.

To dispel the coldly inhuman and gloomy look so common in the spaces under viaducts, we introduced plants with leaves of various colors and textures. For this purpose, we focused on shade-tolerant plants, which can flourish even in the dimly lit environment under viaducts.

City of Yokohama attended the construction of sidewalks and the installation of signs on the old Tokaido highway adjacent the green space, while Metropolitan Expressway refurbished the Namamugi Incident Monument. In this way road construction was used as an opportunity to enhance the beauty of the Namamugi area, creating a more pleasing urban environment.



Greening the area under the viaduct with shade-tolerant plants



Garden path linking to the brewery



Green space under the viaduct at night



Kindergarten pupils taking a walk in the green area under the viaduct

3. Improving the Roadside Environment

Metropolitan Expressway works hard to improve roadside environments, with environmental measures to counteract noise, vibration and other annoyances.

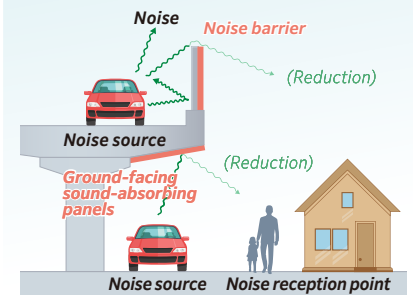
For a Quiet Living Environment

Noise Barriers

Noise barriers are installed to make living environments more comfortable by reducing the propagation of expressway noise into roadside areas. In recent years, to improve the expressway's appearance, Metropolitan Expressway has advanced the adoption of translucent noise barriers.



Installation of noise barriers and ground-facing sound-absorbing panels



Ground-facing Sound-absorbing Panels

Ground-facing sound-absorbing panels are sound-absorbing panels installed on the ground-facing (lower) side of the viaduct. Installing these sound-absorbing panels suppresses the reflection of noise from city streets, contributing to the reduction of noise.

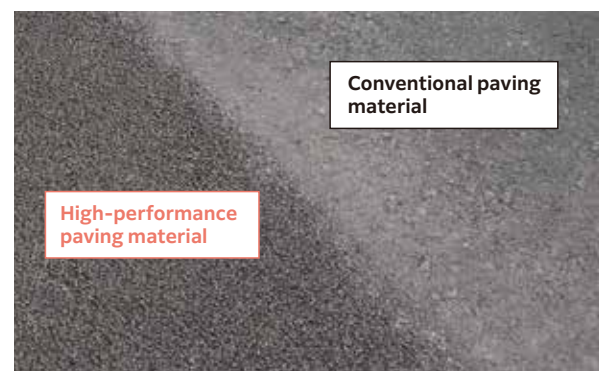
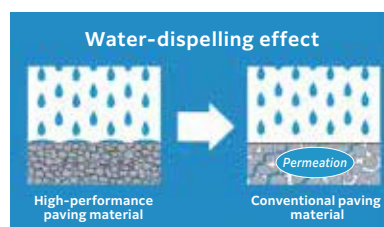
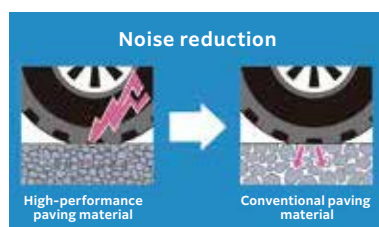


Example of installation of ground-facing sound-absorbing panels (Expressway Route No.3 Shibuya Line, near Ohashi, Meguro City)

High-performance paving

Paving materials containing numerous gaps are used to reduce air compression between the road surface and tires. Metropolitan Expressway is pressing ahead with the installation of these high-performance paving materials, to reduce the "air-pumping"* sound this compression causes.

*Air-pumping noise is noise generated by the release of air pressurized by friction between automobile tires and the road surface.

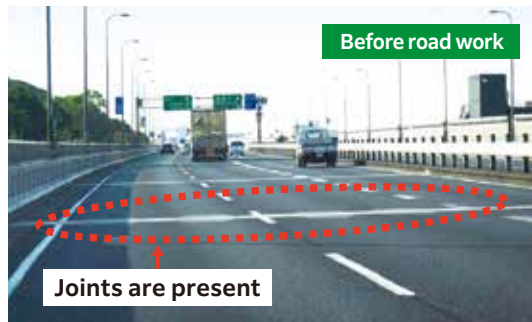


Joint-free Construction

Joints (links that join sections at road's expansion gaps) are impacted by vehicles as they pass over them, making them easy to damage. This damage in turn generates noise and vibration and reduces driving efficiency.

With advances in technology, it has become possible to reduce the number of joints in road construction ("joint-free construction"). This upgrading is under way in numerous locations.

Joint-free construction reduces the number of locations requiring repair, thereby reducing traffic congestion from road work and enabling smoother (eco-speed) driving.



Completion of shaving work



Completion of bar arrangement



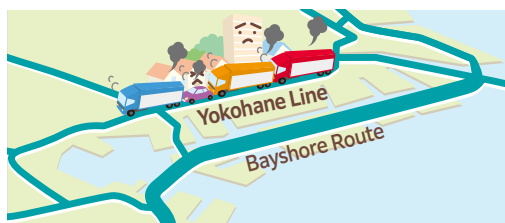
Pouring concrete

For Cleaner Air

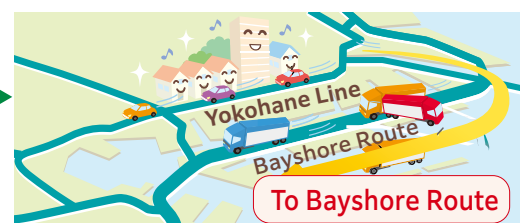
Environmental Road-pricing Discounts

To improve the roadside environment along the Yokohane Line, discounts are provided on tolls for large and extra-large vehicles using the Bayshore Route or the Kawasaki Line. This adjustment encourages drivers of these vehicles to switch from the Yokohane Line to the Bayshore Route.

Exhaust gas adversely affects the environment along the Kanagawa Route No.1 Yokohane Line



Improves the environment along the Kanagawa Route No.1 Yokohane Line



4. Toward a Recycling Society

Metropolitan Expressway is striving to create a recycling society. We are putting materials generated by construction sites and the like to effective use and boosting our recycling rate.

Creating a Recycling Framework

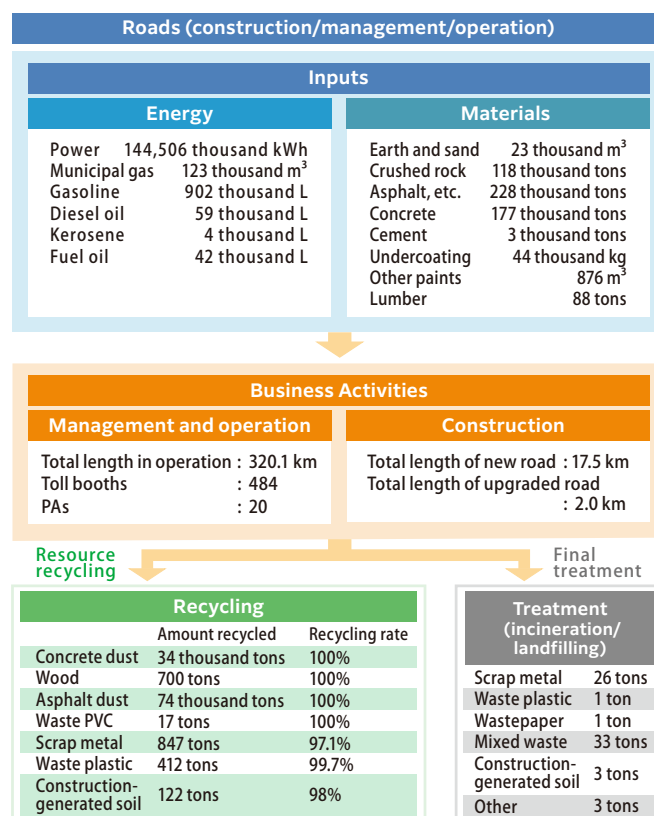
Effective Use of Construction By-products

Metropolitan Expressway is making great strides to reduce its environmental impact. For example, we are putting construction by-products such as earth and concrete dust to effective use as recycled resources.

Procurement Based on the Green Purchasing Act

Based on the Green Purchasing Act (a law of Japan promoting the use of environmentally friendly goods), Metropolitan Expressway makes active use of goods and materials that reduce environmental impact. Metropolitan Expressway sets and addresses targets for each item designated for priority in procurement.

Material flow (FY2018 results)



Fields in which Metropolitan Expressway aims for a procurement target of 100%

1) Paper	6) Office equipment	11) Lighting	16) Work gloves	21) Garbage bags
2) Stationery	7) Mobile telephones	12) Automobiles	17) Other textile products	
3) Office furniture	8) Consumer electronics	13) Fire extinguishers	18) Facilities	
4) Video and photographic equipment	9) HVAC	14) Uniforms, work wear and other apparel	19) Disaster-preparedness equipment	
5) Computer equipment	10) Water heaters	15) Bedding and other interior goods	20) Services	

For New Ideas ...

CIRCULATION SHUTOKO

CIRCULATION SHUTOKO is a recycling project that brings people and ecology together. It was launched to make people more familiar with the efforts Metropolitan Expressway is undertaking for the environment. By recycling and using a wide variety of materials that Metropolitan Expressway and the communities it serves have never used before, we promote a recycling society where the conventional "scrap-and-build" construction approach, a synonym for one-off use and disposal of materials, becomes obsolete.



Example: A tote bag made from used horizontal banners.

5. Environmental Management

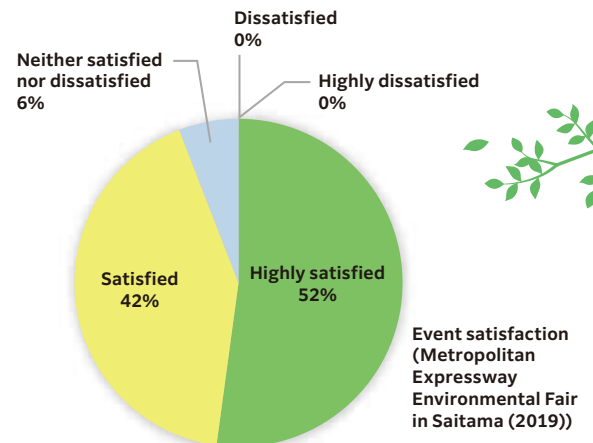
To ensure solid support for the four pillars of environmental actions, Metropolitan Expressway fosters environmental awareness among our personnel and outside our organization. We are also continuously working on development of environmental technology.

Dissemination of Environmental Information

Through environmental events and other initiatives, Metropolitan Expressway cultivates dialogue with regional communities and the general public. We disseminate to a wide audience the latest information on our environmental efforts, aiming to achieve a society in harmonious co-existence with the environment.

Environmental Events

Metropolitan Expressway conducts a range of environmental events, to gain widespread understanding of its many efforts in the environmental space.



Our Website



shutoeco

search



Fostering Environmental Awareness Through Contributions to Society and Activities in the Region

To raise people's environmental awareness, Metropolitan Expressway conducts activities to achieve a better environment as a member of the regional community.

Lights Down

Metropolitan Expressway is committed to taking action against global warming while raising environmental consciousness in as many people as possible. On two festive days in the summer, the summer solstice and Tanabata (the Star Festival), we turn down the lights on five Metropolitan Expressway bridges: Rainbow Bridge, Yokohama Bay Bridge, Tsurumi Tsubasa Bridge, Katsushika Harp Bridge and Goshikizakura-ohashi Bridge.

We also cooperate and participate in Earth Hour, a lights-down campaign hosted by the World Wildlife Fund (WWF).



Rainbow Bridge (fully illuminated)



Rainbow Bridge (lights down)

Open Day at Ohashi Sato no Mori



Normally, Ohashi Sato no Mori is kept closed to the public to preserve its biodiversity. This special day provides a precious opportunity to stroll through this beautiful wood.

A fascinating variety of animals and plants can be observed here in each season.



Observing Japanese rice fish
(*Oryzias latipes*)



Cooperation in Minuma Tanbo Clean Walk

Minuma Tanbo Clean Walk is an event in which people take part in cleaning activities as they walk around Minuma Tanbo. The aim of the event is to stimulate awareness about preserving the natural environment and scenery of Minuma Tanbo.

Normally, Minuma Tanbo is managed in a closed state, to protect its ecosystem. On the day of the event, however, the biotope is opened to the public. Visitors learn about the biotope by viewing panels as they assist by removing trash.



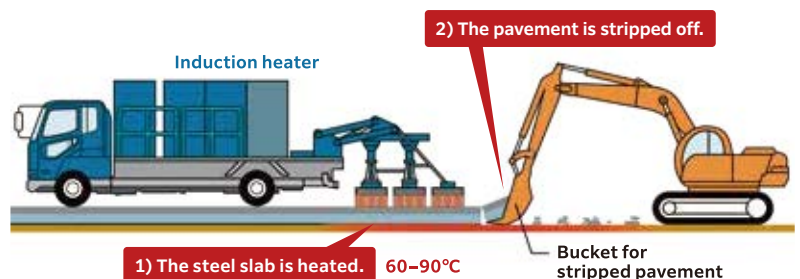
Explanation using panels

Introduction of the IH Pavement-removal Method

The induction-heating (IH) pavement-removal method is typically used to remove asphalt pavement from the steel slabs on which it rests.

In this approach, the IH equipment heats the steel slabs under the asphalt pavement, loosening the contact between the two. The asphalt can then be stripped off easily.

In previous methods, the pavement was removed from the steel slabs using backhoes equipped with rock-breakers, generating a great deal of noise, vibration and dust. The IH pavement-removal method dramatically reduces these problems.



(Reproduced from the website of Nippo Corporation.)

Introduction of Water-based Paints

Metropolitan Expressway is introducing the use of water-based paints, as recommended by the government of Metropolitan Tokyo.

Switching the paints used to repaint steel bridges to water-based paints reduces the generation of VOCs*, thereby restraining the generation of photochemical smog. This move reduces the volume of VOCs generated to 18-23% of their original values.

*"VOCs" stands for "volatile organic compounds." Businesses and governments are making efforts to reduce VOCs, as they are a factor in the generation of photochemical oxidants.



IH pavement removal in operation



Painting a steel bridge



**The Metropolitan Expressway is continuing its
commitment to environmental preservation activities.**

Inquiries

**Metropolitan Expressway Co., Ltd.
Environment Division, Planning and Environment Department
Tel.:03-3539-9388**