06 Enhancing urban development for a disaster resilient city

In light of the 1995 Great Hanshin Awaji Earthquake, the Tokyo Metropolitan Government formulated the Urban Development Plan for Disaster-Resistance in 1996. Following the 2011 Great East Japan Earthquake, in 2012, the Tokyo Metropolitan Council on Disaster Preparedness released estimates for damage in Tokyo caused by a major earthquake directly hitting the capital or other such disaster, which included estimates for a megathrust earthquake and other scenarios. Along with advancing designated routes for improvement and fireproof zone projects as part of the Ten-Year Project to Advance Fire Resistance in Close-Set Wooden Housing Areas, the Tokyo Metropolitan Government is also advancing urban development for a disaster resilient city, including initiatives to improve seismic resistance along disaster response routes.

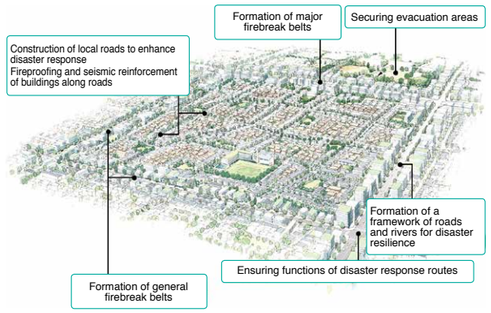
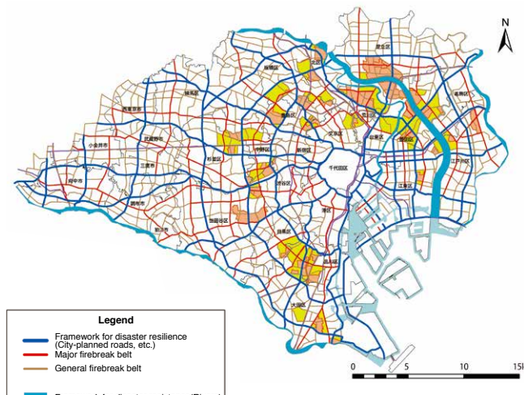
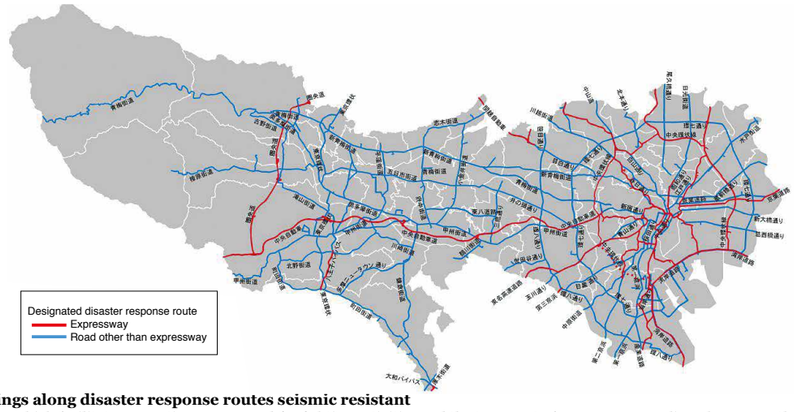


Image of urban development for a disaster resilient city
The Urban Development Plan for Disaster-Resistance, revised in 2016, sets forth creation of firebreak belts, maintaining disaster response route functions, creating safe, quality urban areas, and securing evacuation areas as the basic approach to urban development for disaster preparedness. Measures are being implemented based on the plan with focus placed on creating firebreak belts, making development districts fireproof and earthquake resistant, and improving districts with close-set wooden houses and preventing such districts from forming.
Source: *Bosai toshizukuri suishin keikaku (kaitei)* (Urban Development Plan for Disaster-Resistance, Revised) March 2016. Bureau of Urban Development, Tokyo Metropolitan Government.



Firebreak belt development districts and priority development districts (Updated in 2016)



Making buildings along disaster response routes seismic resistant
To prevent roads, which facilitate evacuation, rescue and firefighting activities and the transport of emergency supplies when an earthquake strikes, from being blocked, due to events such as building collapse, the Tokyo Metropolitan Government established an ordinance to promote the seismic retrofitting of buildings along disaster response routes in Tokyo, making it mandatory for owners of buildings that meet certain requirements along arterial roads that serve as major arteries (buildings along designated disaster response routes) to report on their property's seismic resistance status and perform seismic resistance assessments. The Tokyo Metropolitan Government has also been providing financial support, including seismic evaluations, which are free of charge as a rule, and subsidies covering up to 90 percent of seismic retrofitting costs. Furthermore, the metropolitan government is strongly encouraging building owners to enhance seismic resistance, including making the results of seismic resistance assessments public in 2018.
Source: Tokyo earthquake-resistant portal site.

Example of utility pole removal
In September 2018, an ordinance to promote the removal of utility poles was put into effect to promote removal along metropolitan roads in areas around venues for the Tokyo 2020 Games and other locations by the time the Games are held, raise Tokyo's disaster management capabilities, and to create urban spaces befitting the host city.
Source: Bureau of Construction, Tokyo Metropolitan Government.

Source: Bureau of Urban Development, Tokyo Metropolitan Government.

Source: Business cooperative to develop a disaster resistant block in the Nakanobu 2-chome district (site of a former Dojunkai housing development).

Example of fireproofing (reconstruction into shared residences)
The ratio of fire-resistant area is an index which shows how fire resistant a built-up area is.
Ratio of fire-resistant area = Open space ratio + (1- Open space ratio/100) x fire resistance rate (%)
Open space ratio: Area occupied by open space such as roads and parks
Fire resistance rate: Proportion of area occupied by fire resistant buildings (steel reinforced concrete construction, etc.) in relation to all buildings in the area
When the ratio of fire-resistant area exceeds 70 percent, this means there is almost no danger of fire spreading in a built-up area.

Measures to Prevent Urban Flooding

◉ Cities, which have lost their capability to retain water, due to a concentration of buildings and being covered by roads and paved surfaces, are now subject to the risk of urban flooding, which occurs when rain water, including that generated by torrential downpours, flows into rivers and the sewer system over a short period of time.
◉ To cope with this, since the 1980s, the Tokyo Metropolitan Government has been advancing enhancements to stormwater management measures, and in addition to improving rivers and the sewer system, it has been working on comprehensive flood management measures, including studying a new stormwater removal system.
◉ In locations where river widening and other types of river channel development require an extended period of time, such as in areas where buildings and houses line the river bank, the TMG has worked to build regulating reservoirs that store a portion of flood waters, as well as diversion channels that provide a different route for a portion of flood waters to use, to quickly improve safety with regard to flooding. Flooding has occurred frequently in the Kanda River middle basin. Since use of the first section of the Kanda River/Ring Road No. 7 Underground Regulating Reservoir started in 1997, flooding has been greatly reduced downstream.

Kanda River/Ring Road No. 7 Underground Regulating Reservoir
Source: Bureau of Construction, Tokyo Metropolitan Government.

	Typhoon Vernon (August 27, 1993)	Typhoon Ma-On (October 9, 2004)
Total rainfall amount (hourly rainfall)	288mm (47mm)	284mm (57mm)
Inundation area	85ha	(47mm)
Houses flooded (above floor level and below floor level)	3,117	46

Comparison between Typhoon Vernon (1993) and Typhoon Ma-On (2004)
Source: *Kandagawa-kan-jonanagosen chikachosetsuchi* (Kanda River/Ring Road No. 7 Underground Regulating Reservoir), March 2016, Bureau of Construction, Tokyo Metropolitan Government